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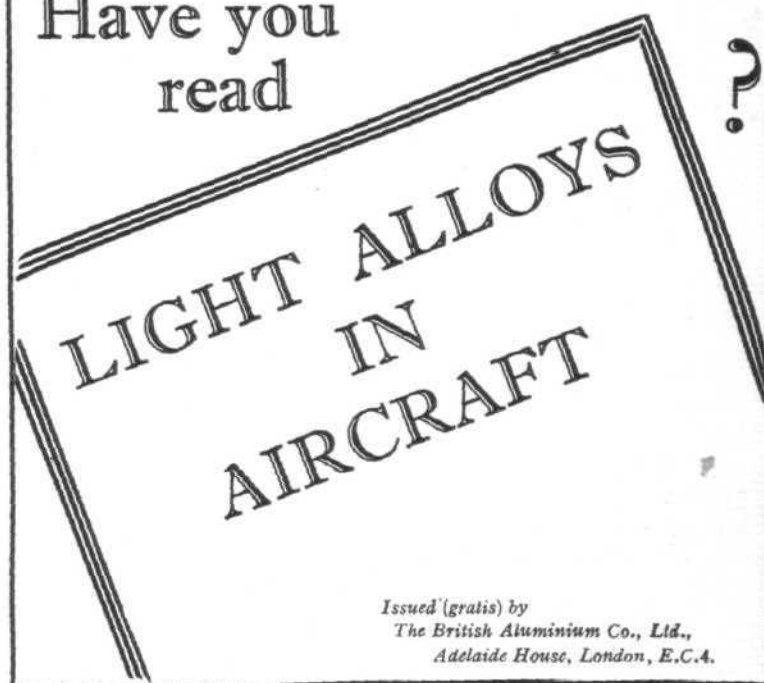
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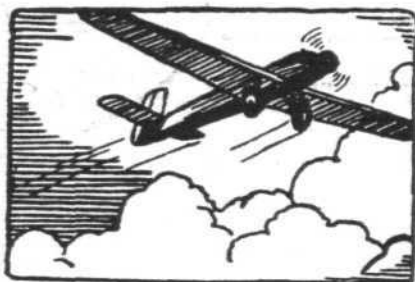
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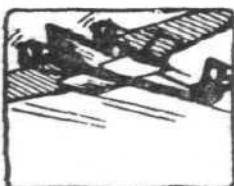
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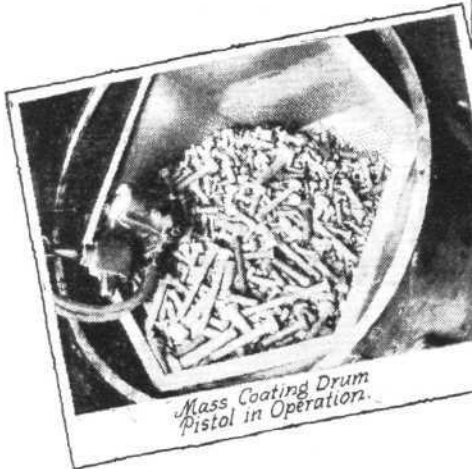
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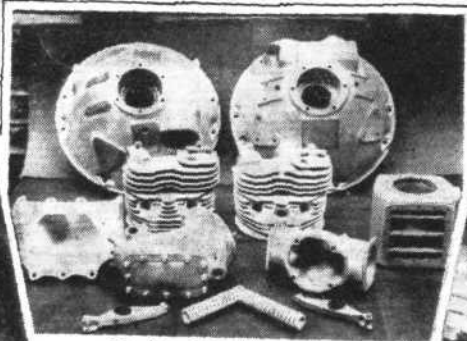
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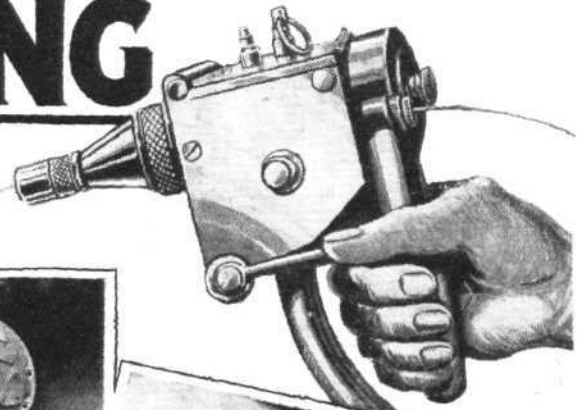
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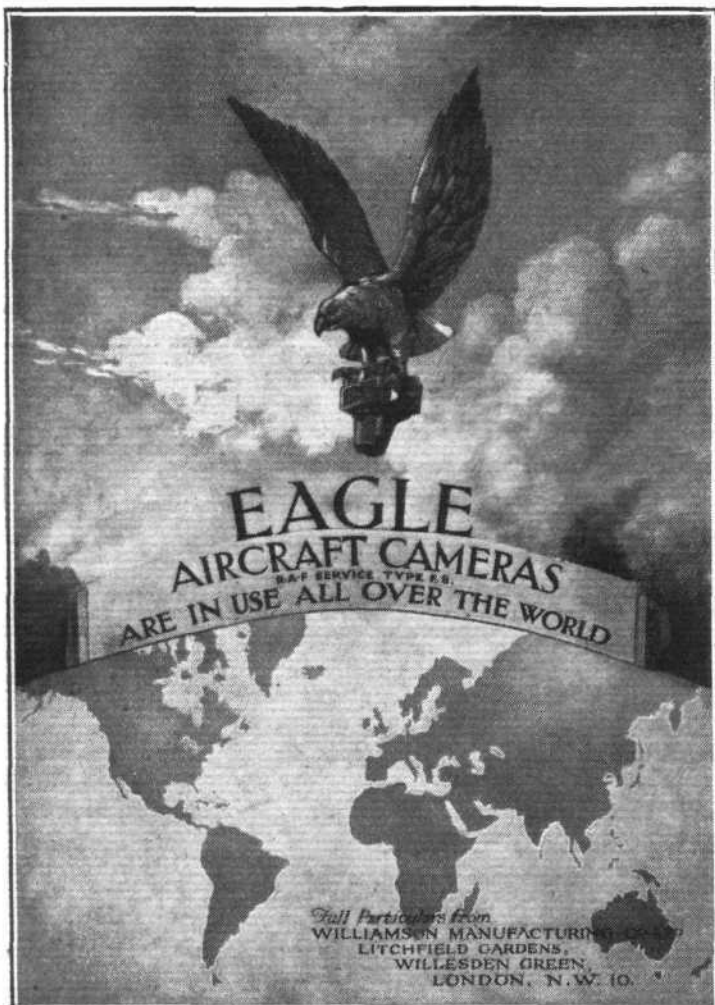
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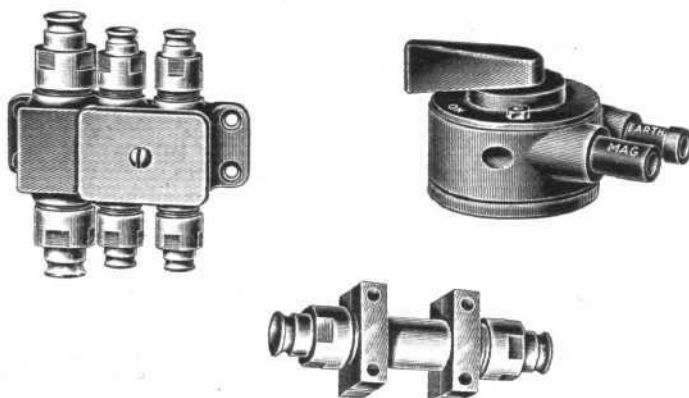
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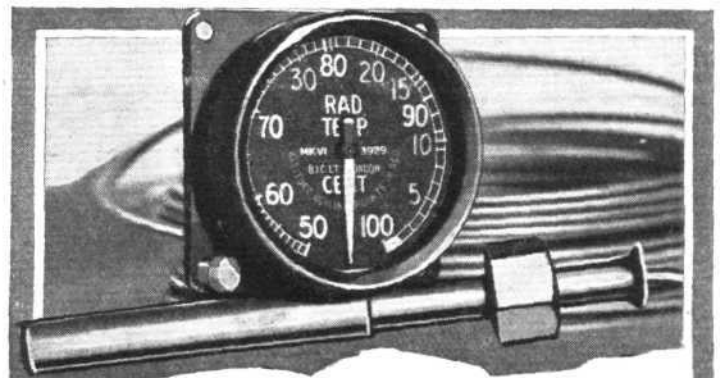
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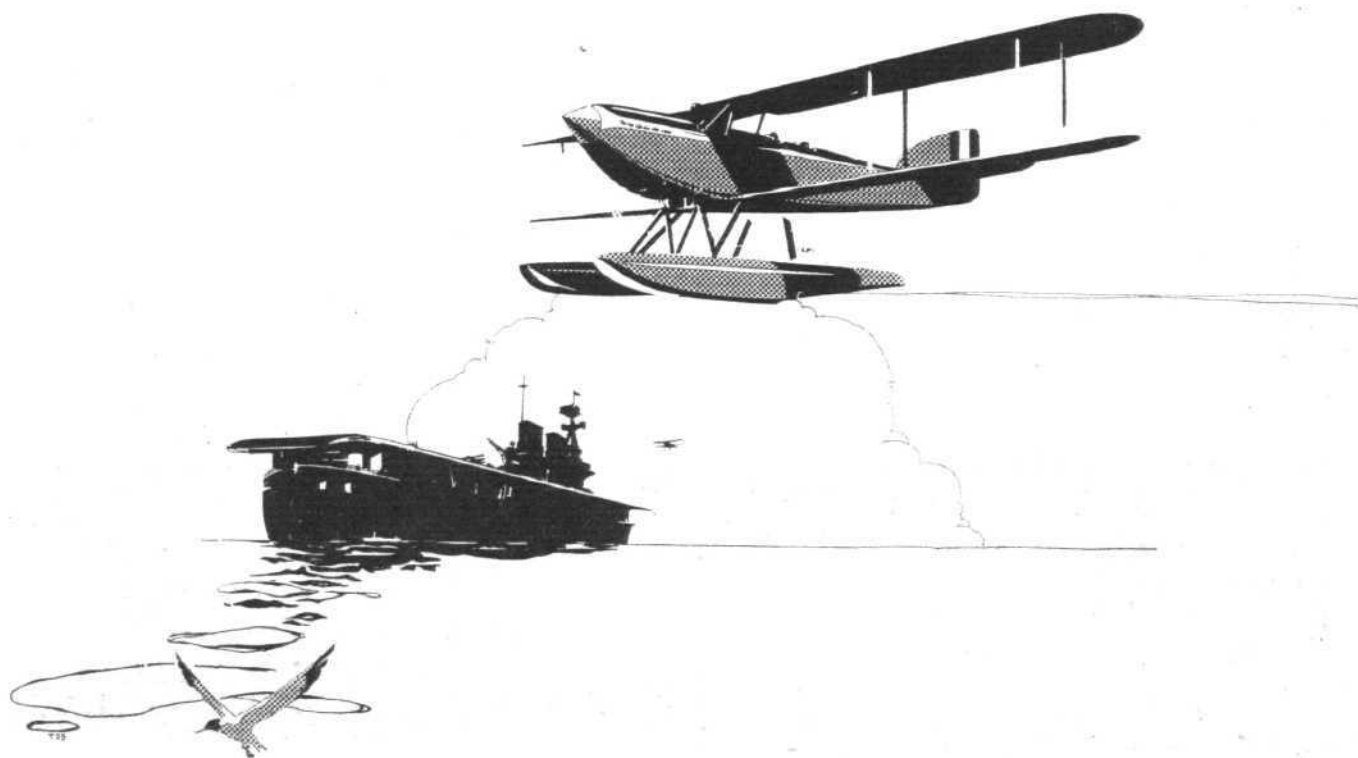
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No. 1086. (No. 42. Vol. XXI.)

OCTOBER 18, 1929

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EDITORIAL COMMENT



THE lecture given before the R.Ae.Soc. and I.Ae.E. by Mr. Fairey last Thursday held, perhaps, at least as great potential interest as it did topical. In presenting his case for the range of aircraft Mr. Fairey naturally had to touch upon the reasons which had led him to choose the monoplane type in preference to the machine designed to attempt to establish a new world's record for straight-line distance, and as it was known that a great many designers do not share Mr. Fairey's views as to the superiority of the monoplane, it had been expected that much of the discussion would have turned on this point. Actually this did not prove to be the case. Mr. Farren, whose paper some months ago showed him as a "biplanist," refrained from going very deeply into that subject. A certain number of speakers during the discussion did, rather timidly, suggest that the biplane might have been a better choice, but no serious challenge to Mr. Fairey was forthcoming. For some reason Mr. Sopwith did not take part in the discussion. This was regrettable, as it is believed that he is an advocate of the biplane. At any rate his "Horsley" biplane did a longer non-stop flight than any British machine until Jones-Williams beat it in the Fairey monoplane, and it would have been extremely interesting to hear what a pioneer of British flying and aircraft construction had to say on the subject. As it was, Mr. Fairey fairly easily answered all criticisms (if they could be regarded as such) concerning induced drag and so forth by pointing out that while a biplane might have given lower induced drag, it would have been necessary to place the fuel in the fuselage instead of in the wings, and that the extra fuselage drag that would have resulted would have nullified the reduction in induced drag. Whether the lighter biplane structure, enabling a greater petrol load to be carried, would have tipped the scales in favour of the biplane is rather a delicate question.

On two points at least the meeting appeared fairly well agreed: the similarity between high-speed

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1929.	
Oct. 24 Lecture, "The Art of Flying Land and Sea Machines," by Capt. N. Macmillan, before R.Ae.S. and Inst.Ae.E.
Oct. 31 Guggenheim Safe-Aircraft Competition Closes.
Nov. 7 Lecture, "Recent Developments of Fuels and Dopes for Aircraft Engines," by Dr. A. E. Dunstan, before R.Ae.S. and Inst. Ae.E.
Nov. 21 Lecture, "The Inspection of Materials," by Mr. L. W. Johnson, before R.Ae.S. and Inst.Ae.E.
Nov. 28 Lecture, "Flying and Maintenance from the Owner's Point of View," by Sq.-Ldr. H. M. Probyn, before R.Ae.S. and Inst. Ae.E.
Dec. 5 Lecture, "Recent Work on the Autogiro," by Senr. J. de la Cierva, before R.Ae.S. and Inst.Ae.E.
Dec. 12 Lecture, "The Development of Materials for Aircraft Purposes," by Dr. W. Rosenhain before R.Ae.S. and Inst.Ae.E.
1930—	
Jan. 22 Lecture, "The Strategical Mobility of Air Forces," by Gp.-Capt. C. L. Courtney, before Royal United Service Inst.
Mar. 5 Lecture, "Air Co-Operation with Mechanised Forces," by Wing-Com. T. L. Leigh-Mallory, before Royal United Service Inst.

machines and long-range machines in regard to necessity for efficient aerodynamic design, and the beneficial effects which the application of the lessons from long-distance aircraft to commercial aircraft would have. To us it seems that neither is true without considerable reservations.

It is, of course, quite obvious that, to take efficient aerodynamic design first, a reduction in head resistance is essential in both cases. But there surely the similarity ceases. The high-speed machine has to have as low profile drag and as low parasite resistance as possible so as to enable it to attain the highest speed with the smallest power expenditure. But, induced drag being a negligible proportion at high speeds, the need for large span is absent. The span can, in fact, be reduced until the machine will only just get off with it. The power loading is low, and float water resistance is of more importance than induced drag. In the long-range aircraft, on the other hand, it is not only at the moment of taking off that low induced drag is important. The cruising speed is so low that induced drag is important throughout the flight. Consequently the long-range machine demands low span-loading.

The long-range machine as an improver of the breed of commercial aircraft sounds, on the face of it, more logical. As Mr. Fairey stated in his paper, fuel and pay load can, to a certain extent, be regarded as interchangeable, and the long-range machine with high L/D value (that of the Fairey monoplane had a maximum of rather more than 15, probably the highest value ever attained by a machine of this class) should be a very efficient commercial aircraft. But here, again, one has to take into consideration quite a number of "ifs" and "buts." The passenger who pays rather more than first-class railway fare for his ticket would probably object to being put inside a wing a foot deep or so! And if room were to be provided in the fuselage then that would have to be made larger, with the result that the L/D ratio would get worse. What the long-range machine does teach us is the suppression of all excrescences.

Then there is the vexed question: single-engined or multi-engined machine. There is no doubt whatever that, as Mr. Fairey pointed out, the carefully-designed single-engined machine has a lower drag than the multi-engined. But the point is that Imperial Airways, Limited seem to have laid it down as a governing principle that all passenger machines must have at least three engines. So long as that view is upheld it would appear that, no matter how greatly we improve our long-range single-engined aircraft, it will be the three-engined or four-engined machine which needs development. And the improvement in the single-engined machine will help it but little. That this is not merely a view, but an established fact about which there can be no discussion, is borne out by the fate of the Vickers "Vellore." Designed as a goods-carrier, that machine was, like the Fairey monoplane, an extremely efficient air-

craft. It carried a very high pay-load per horsepower, but it was not taken up for practical use on the air routes.

Logically, if we accept the multi-engine ruling, the long-range single-engine machine is certainly well worth going on with for the sake of records and the advertisement which records bring with them, but it does not appear quite logical to claim that it is also of benefit to the commercial machine.

We have repeatedly advanced the view in FLIGHT that the time is long since due for specialising in commercial aircraft. The carrying of passengers, mails and freight in the same type of machine is not, cannot possibly be, the most efficient way. And this is exactly where, to our way of thinking, the highly-efficient, single-engined machine will come into its own. When Mr. Fairey referred to the interchangeability of fuel and load, he most probably had in mind mails and not passengers. In this connection it is interesting to reflect that the Fairey long-distance monoplane could, with relatively minor modifications, be used as an Empire mail-carrier. Mr. Fairey himself pointed out in his paper that with a machine of 2,000 miles' range the India air mail could be carried to Karachi in 60 hours overall time. And with fuel for this range a machine like the Fairey monoplane would be able to carry quite a respectable pay-load in the form of mails. In fact we should imagine that, if so used, a "sister ship" would come very close to paying for itself without the aid of such artificial stimulants as subsidies. The "Vellore," although probably a slower machine, would also appear to be very well suited for such work, and it does seem a pity, with such efficient machines available, not to make use of them.

Without wishing to raise once more the controversy of single-engined or multi-engined machines, we do think that in formulating any future policy of Empire air routes, the possibilities of using the single-engined type for certain classes of work should be very seriously considered.

The passenger machine on the long Empire air routes, being required to give a fairly high degree of comfort to the occupants, will probably never attain the aerodynamic efficiency which a machine designed for less bulky loads may achieve. Moreover, we are extremely doubtful whether passengers will habitually fly stages of 2,000 miles non-stop, except in very special cases, and considerations other than aerodynamic may therefore well determine, or at least greatly influence, the general character of their design. But for mail aeroplanes the same considerations do not obtain, and if the powers that be can be persuaded that single-engined aircraft with engines of proved reliability may be entrusted with the mails, then progress may be made, and in that case we shall be justified in claiming that the production of long-range aircraft directly benefits commercial (mail) aeroplanes.

French Air Estimates

THE Paris correspondent of the *Times* states that the Finance Committee of the Chamber has made considerable reductions in the credits asked for in the Air Estimates by M. Laurent-Eynac, the Air Minister. Provision for the construction of aircraft in quantities was reduced by £288,000, credit intended for the concentration and redistribution of aircraft construction by £80,000, and subsidies to aircraft-operating companies by over £70,000. The total figure for

subsidies approved by the committee is now £1,600,000. M. Laurent-Eynac proposed to start a new air line to Venezuela via the Antilles and Guiana, with a later extension to Peru, but the committee thought the air lines from France to Indo-China and the Congo should be organised first. It was, however, decided to recommend the expenditure of £40,000 for the purposes of a light aeroplane competition and to encourage the purchase of private aircraft, and of another £40,000 on the establishment of a national aircraft factory,

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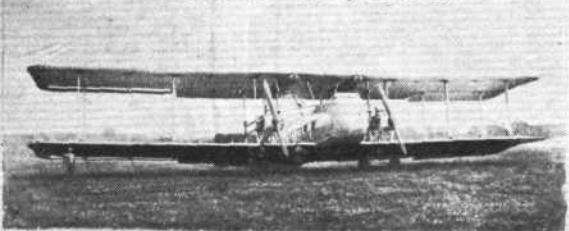
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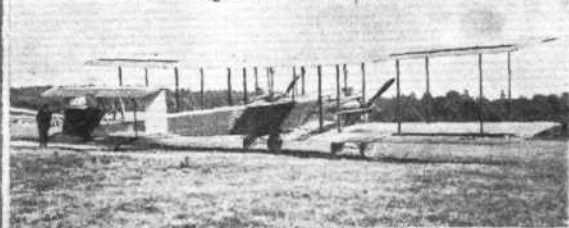
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AFTER 51,000 MILES COST OF REPLACEMENT

On reaching the pre-determined total of 600 flying hours with only a routine external attention, the sealed Gipsy Engine, after undergoing a third brake test, has been thoroughly dismantled and every part submitted to a searching scrutiny under the supervision of the Air Ministry Aeronautical Inspection Directorate. The above highly satisfactory data appeared.

Petrol (Pratts No. 1) and oil (Castrol XXL) consumptions remained constant throughout the tour, while the loss of efficiency was both slight and gradual — by reference to the curve reproduced, it will be seen that the total drop at 2,500 r.p.m., for example, is only 2.5 h.p., or

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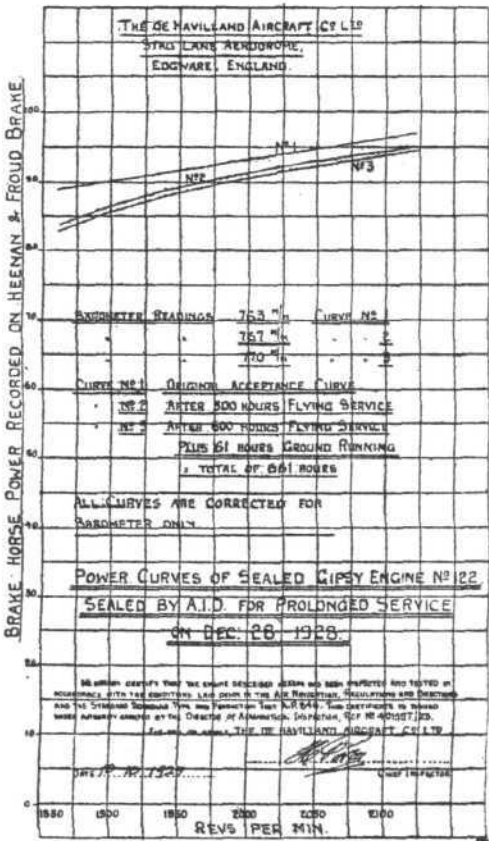
2.375%, despite the fact that no decarbonisation took place, and valves were not ground in.

The replacements necessary to re-condition this engine throughout for renewal by the Air Ministry of the Certificate of Airworthiness are, without exception, confined to those components in which slight wear is expected under prolonged service in any internal combustion engine, such as piston rings, valve guides, etc.

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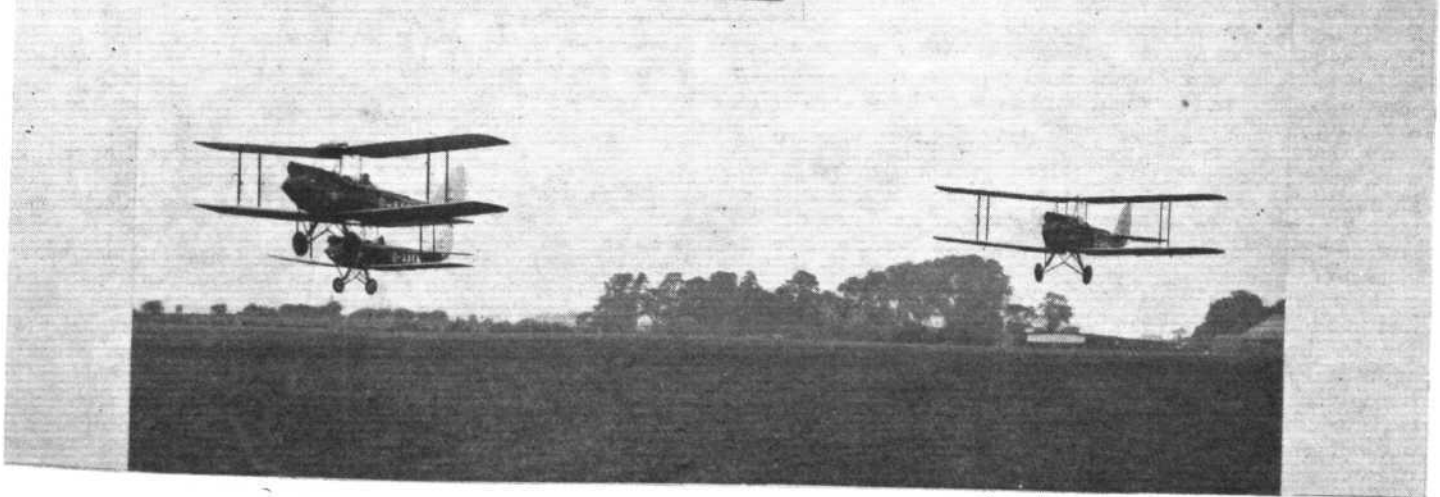
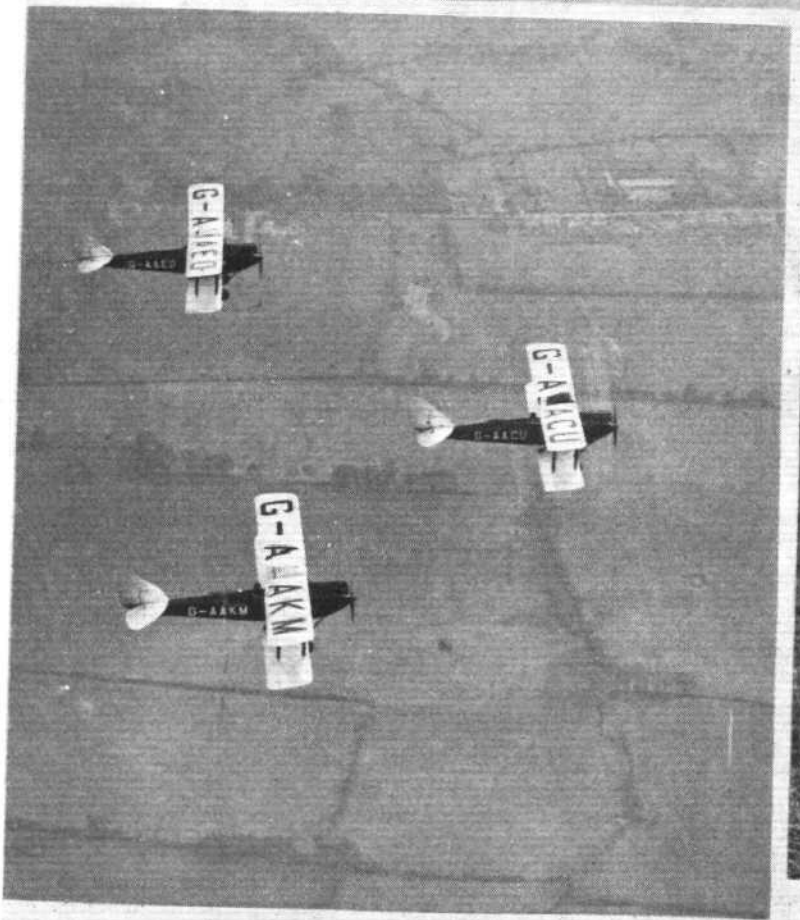
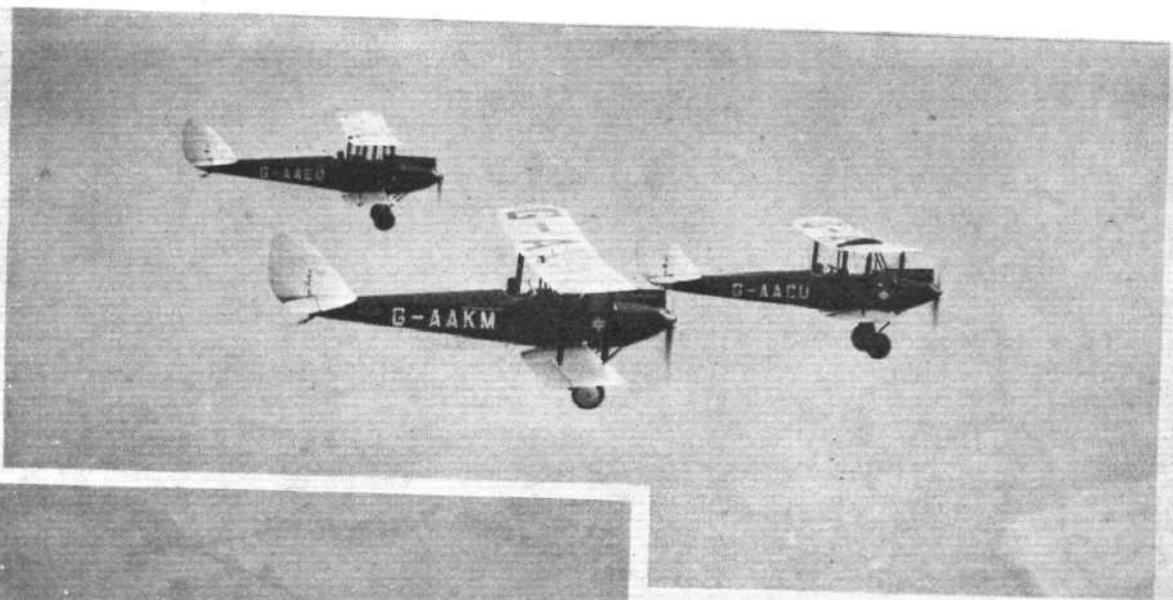
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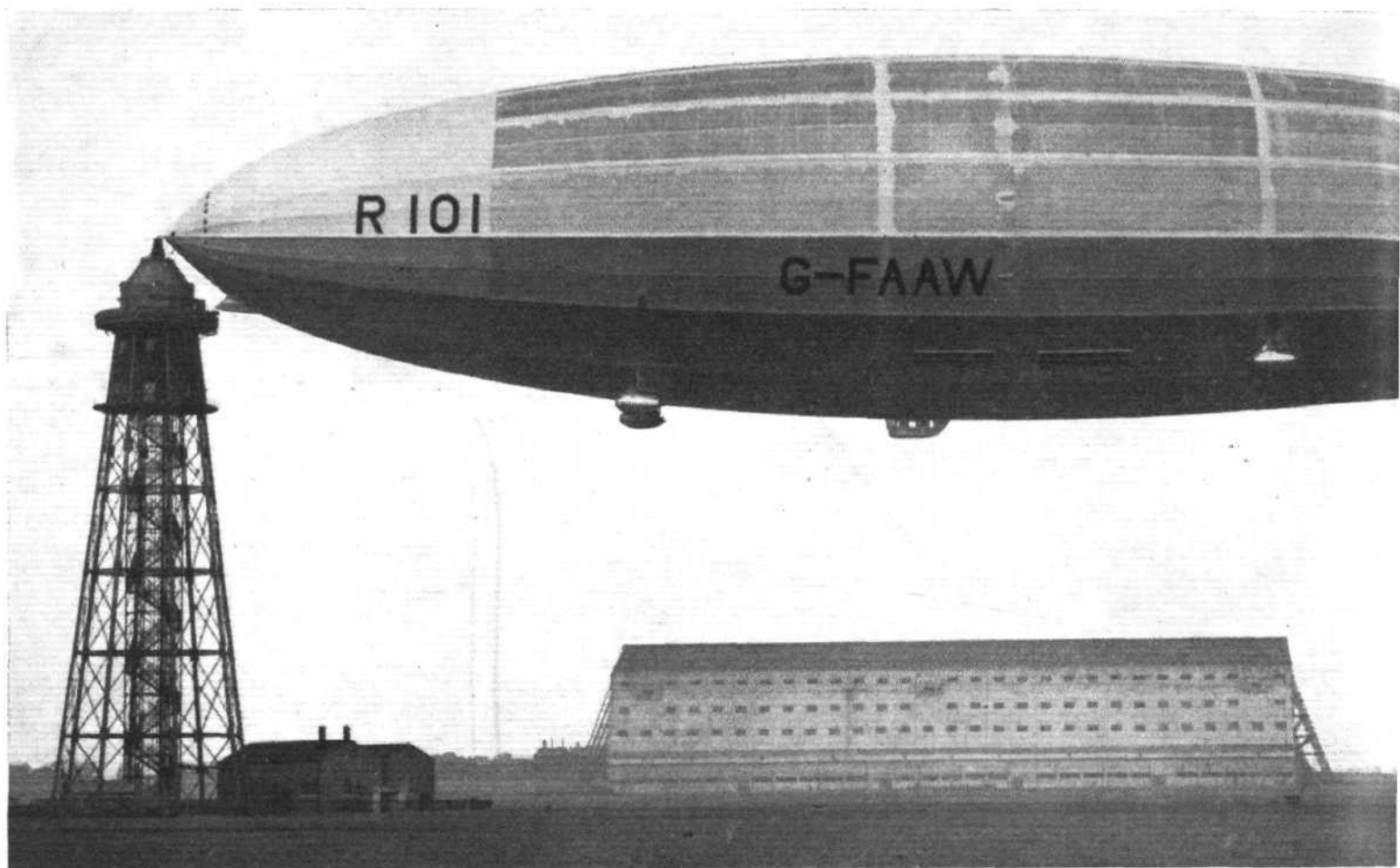
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["FLIGHT" Photograph.]

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B.I.G. FLYING : Capt. Lamplugh, of the British Insurance Group, has long been a pilot, and is a Flying Officer in the Reserve of Air Force Officers. Colleagues of his, Mr. W. R. Massey (on Capt. Lamplugh's right) and Mr. A. G. Hawood (on Capt. Lamplugh's left) are Flying Officers in No. 600 and No. 601 A.A. Squadron, respectively. They are here seen doing some very good formation flying on three "Gipsy-Moths" of the de Havilland Flying School. ("FLIGHT" Photos.)



LAUNCH OF R.101

AIRSHIPS, so the experts tell us, are not at all fair-weather craft when they are in the air or at the tower head. But on a few definite occasions in their career they demand an almost flat calm. Those occasions are when they are being manhandled out of or into a shed. Such occasions should, in the future, be rare.

On Tuesday, 8th inst., there seemed just a chance of good weather, and a provisional notice was issued by the Air Ministry. Immediately the roads between London and Bedford began to grow black with cars. It was a filthy night, too, with gusts of wind and showers of rain, and after dark the road was no pleasant place. During the night a wonderful change took place, and by dawn next day the sky was clear. But, alas, on the gates of the Royal Airship Works was a forbidding blackboard with a notice that R.101 would not leave her shed at 6 a.m., but that a further notice would be issued at 10 a.m. What wind there was, was blowing across the shed, and it would have been madness to attempt to move the ship.

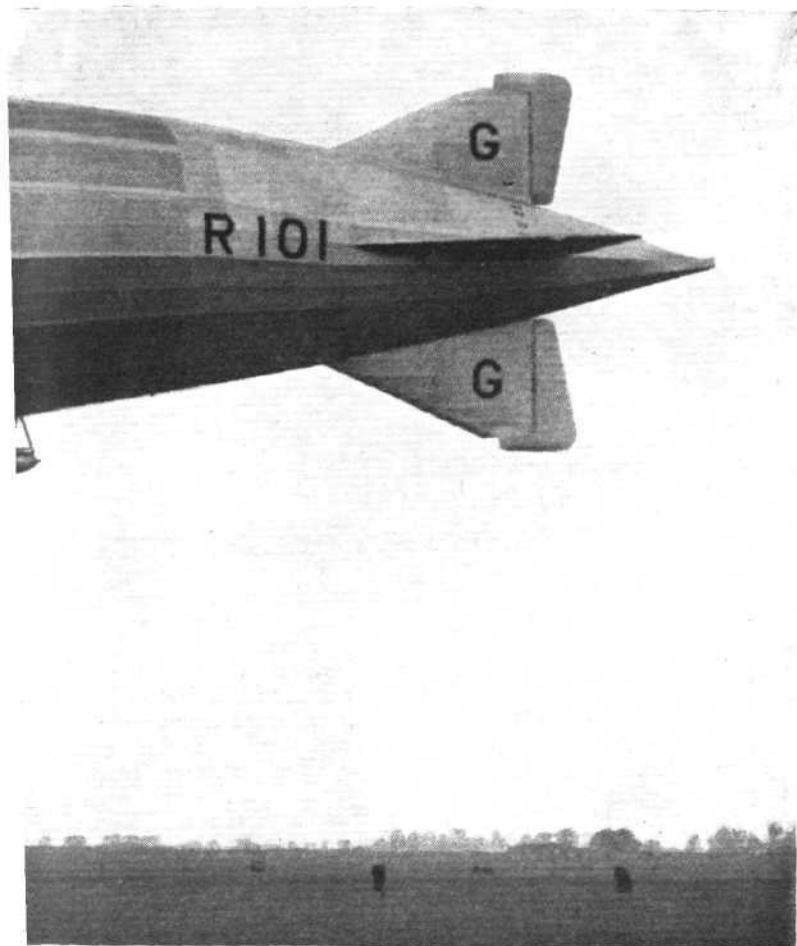
By 10 a.m. the weather was obviously worse, and operations were washed out for the day. But the meteorologists reported an anticyclone moving in from the Atlantic, and they were almost prepared to stake their lives that at dawn on the morrow the conditions would be ideal. No doubt meteorologists mean well. Everyone was jubilant. It really seemed that the great day was at last about to dawn. But the luck had not turned yet. Somewhere about 3 a.m. next morning the staff held a conference on the latest weather report, and another postponement was reluctantly decreed. It must have been a very gloomy gathering. It seems that the expected fine weather actually arrived within 100 miles of Cardington, but had not the grace to come on for that last trifling distance.

At last, on Friday, the 11th, the much maligned meteorologists scored a bullseye. They foresaw a good chance at 6 a.m. next day, and so the walking party was warned. This party consisted of 200 employees of the Royal Airship Works, 150 R.A.F. airmen from the neighbouring aerodrome of Henlow, and 50 civilians from Bedford town, 400 in all. Elaborate arrangements had been made to rouse the Bedford men at any hour of the night and get them out to Cardington

in haste. Henlow, of course, is in direct telephonic communication with the R.A.W.

The morning of Saturday, 12th, was not quite ideal after all, for there was a slight wind blowing across the shed, but it was decided none the less to proceed with the operation. During the press visit on the 2nd inst., the ship was floating some seven tons light in her shed, and was held down to the floor by weights. Now she was ballasted up to a state of equilibrium. Two white lines had been painted down the floor of the shed to guide the party which had charge of the control car. Other parties were disposed along the hull so as to control movement at any point and in any direction. No doubt the party had been drilled in some way, and disciplined men can always do wonders under good N.C.O.'s; but there is no mock-up of R.101 on which to practise. None of the party can have taken part in walking an airship since R.33 was flown at Cardington before the Dominion Premiers, and not very many of the 400 can have been at that exhibition. In any case, the bulk of R.101 is twice that of R.33, so that in every way this walking out was a totally new experience. Everything went off like clockwork.

Maj. G. H. Scott took command, and he must have felt proud to have an airship under his control once more. He has seen this ship born, and watched it in its swaddling clothes. He has said openly to critics that he believes R.101 is a thoroughly sound ship, and that he would fly her with confidence when the time came. The time had nearly come; the first step, at least, was about to be taken. The foreman of the walking party reported "All clear, Sir," and then through Maj. Scott's megaphone came the momentous order "Walk the ship ahead." Now for it! Would she clear the shed safely? The party started to walk, and the ship, weighing just the same as the air, obediently came with them. The nose projected out of the shed. Those two dark sheds have for long looked a disfigurement on the great Bedfordshire plain, though their size has lent them dignity and to some extent redeemed their ugliness. But there has always been romance about shed No. 1, for everyone knew that it contained the mysterious airship which was so much discussed. Now the doors were open, and the silver nose of the fledgling appeared through the crack in the gloomy shell. Then the force of the cross wind was felt to some extent, but the walking party kept good control. In a few minutes came the report "All clear, Sir," and the critical moment had passed. The



distant crowds lining the roads burst into delighted cheers.

Steadily the party walked the ship across the open ground to the tower. The cable had been paid out from the head of the tower and its end lay on the ground. The airship also paid out her cable, and the ends were rapidly connected on the ground. Then the walking party let go their hold, the ship discharged some water ballast and began to rise slowly and gradually into the air. The side guys were secured to two bollards on the ground. Then the winches took charge and the nose of the ship was hauled up to the mast and made fast with the permanent coupling. As soon as this was done the cables were parted and wound in by ship and tower respectively, while the moving arm on top of the tower was locked rigidly in a vertical position. R.101 was moored at last.

While this great airship was in the shed, it was impossible for the eye to take in her shape and size, and to form any opinion of her. Out in the open air she looks grand. The streamline shape, with the $5\frac{1}{2}$ to 1 fineness ratio, gives her a perfectly graceful appearance. There is not a straight line about her anywhere. Everywhere she curves, and the curves look as though they had been designed by nature for a fish of the air. The fins, too, look in perfect proportion, while the absence of any excrescences, apart from the engine cars, the control car, and the steam radiators, gives her a clean appearance such as no previous airship has ever been able to boast. The only point which might be said to detract from her appearance is the dope on her outer cover. The

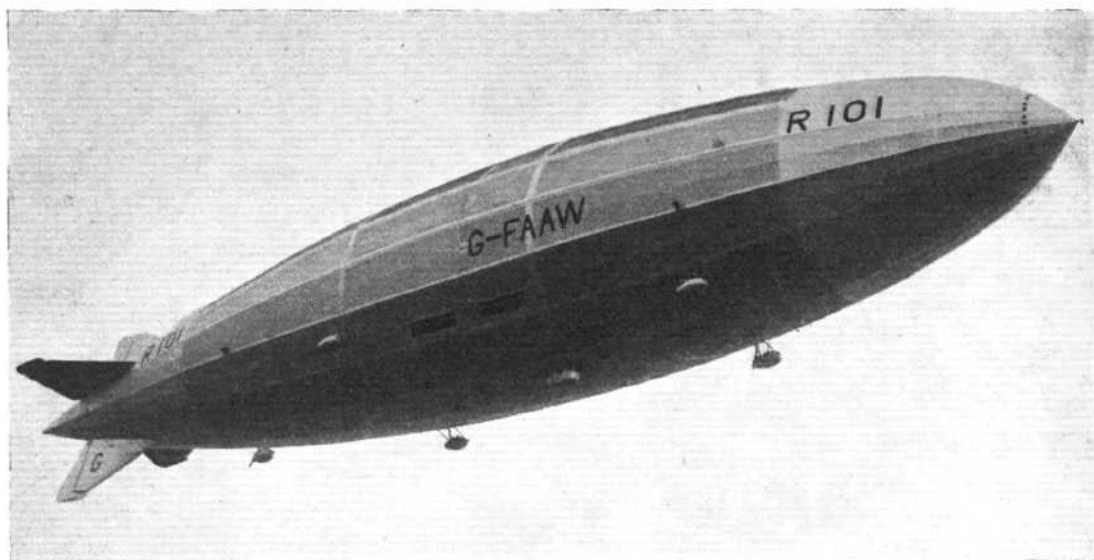


Three photographs which illustrate the beginning of the first flight of R.101 : The airship attached to the mast and, below, just cast off. Note the dropping of water ballast. ("FLIGHT Photos.")

panels of fabric were doped separately before being put in place, and so different shades can be seen from the ground. The ocular effect is better when the fabric is doped all together after being put in place ; but there are advantages in the new method which outweigh any loss of skin-deep beauty.

For 48 hours the ship rode steadily at the tower head, with a crew of 50 living on board. The commander of this

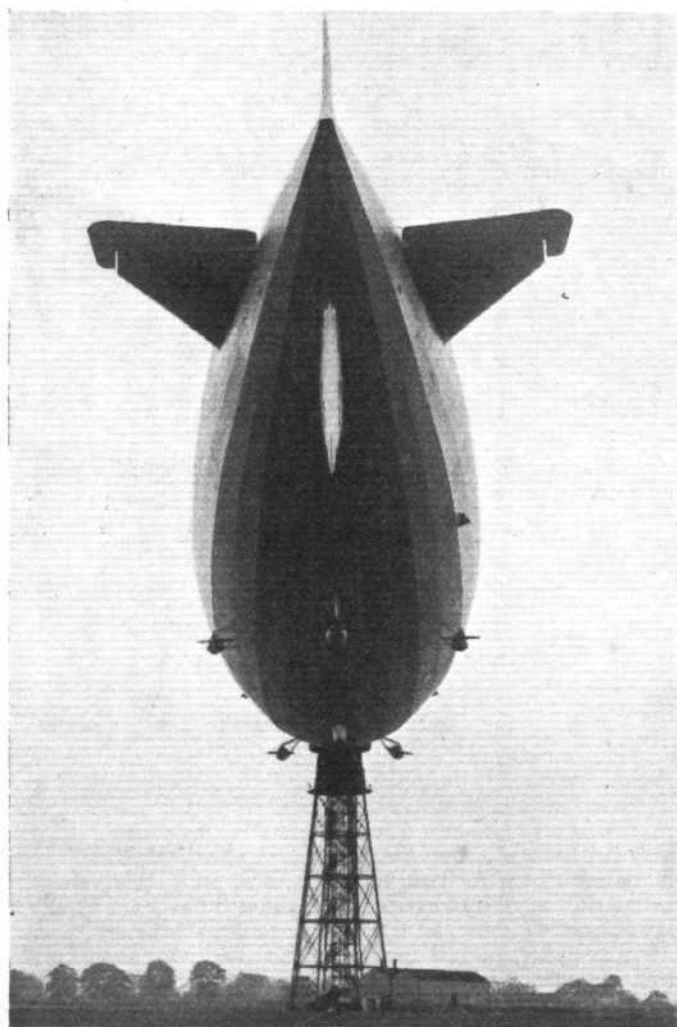
Well Away: In this view R.101 is in free flight shortly before heading for London.
("FLIGHT" Photo.)



ship is Flight-Lieut. L. C. Irwin, with Lieut.-Commander N. G. Atherstone as first officer and Flying Officer M. L. Steff as second officer. Major G. H. Scott is in charge of all airship flying, and will in due course put R.100 also through her test flights. During the period at the tower, the ship was allowed to rise, and then hauled down again by the winch and made fast. Everything worked as well as could be desired. It was then felt that a trial flight could be undertaken.

The First Flight

Monday, October 14, was a grey day with moving clouds and some mist, but not at all a bad day for flying. Major Scott again took command of R.101, and at 11.19 a.m.



"Tail Well Up": A somewhat curious view of R.101 at the mooring mast at Cardington.
("FLIGHT" Photo.)

she was slipped from the tower. The intention was to make a flight of five hours, flying very gently and getting the feel of the ship. She soared away gently from the tower, and then turned up wind. It was not expected that anything would go wrong, and as a matter of fact nothing did go wrong, but it was prudent to make the first move up wind, so that if the unexpected happened the wind would help her home. When all was found to be going well, the ship was put about and headed for London. About 1.30 she came in over Hampstead Hill, and then moved on, very stately and slow, to Buckingham Palace. It seemed a pity that T.M. the King and Queen were at Sandringham, for they would certainly have enjoyed the wonderful sight as much as millions of their subjects enjoyed it. During the week-end at the tower, it is reckoned that nearly a million people found their way to Cardington to see the airship, and the police said that the traffic congestion on the roads was worse than on a Derby Day.

R.101 seemed to move imperceptibly as she passed over London, and at times some of her propellers were quite still. From Buckingham Palace she passed on over Westminster, and then over the City. At 2.30 the watchers on Hampstead Heath got a last, but quite long view of her as she vanished in the direction of her home. On the way back the speed was increased for a space to more than 50 m.p.h., which was not too bad for the first flight. By 4 p.m. she was over Cardington at a height of some 2,000 to 2,500 ft. She dived slowly, and at 4.15 she dropped her mooring cable, which was rapidly coupled to the tower's cable, as before. She was then hauled down very slowly, and at 4.49 the tower's coupling was snapped round her mooring cone. From dropping the cable to being made fast took just 34 minutes. This time can doubtless be improved with practice, and when all concerned are more completely familiar with the ship. The comparative leisureliness of the proceeding is all in keeping with the cautious policy which has been followed with this airship. But at the worst, half an hour over mooring is not a tremendous time for even an impatient passenger to wait. *Moi qui vous parle* have waited an hour in the Royal Scot outside Euston station.

After disembarking, Major Scott, speaking in his quiet way, and with his typical moderation, said that everything had gone well. The noise of the engines had only been very slightly heard in the passenger saloon. There had been no engine trouble. In fact, no trouble of any sort. Everything was most satisfactory. She had handled nicely and answered her controls well. Then, apparently remembering the criticisms which have been made about the shape and size of the ship, Major Scott added with some emphasis, that her ease of control promised well for the future of the big airship.

A progressive series of flights will be undertaken, and in due course the ship will be put through full-speed trials. Not until all the trials have been successfully accomplished can we pronounce R.101 to be a complete technical success. But she has certainly made a good start, and so far as the first flight goes, Col. V. C. Richmond and all his helpers deserve the heartiest congratulations.

F. A. de V. R.

As we are about to go to press it is announced that another flight will be made on October 17.

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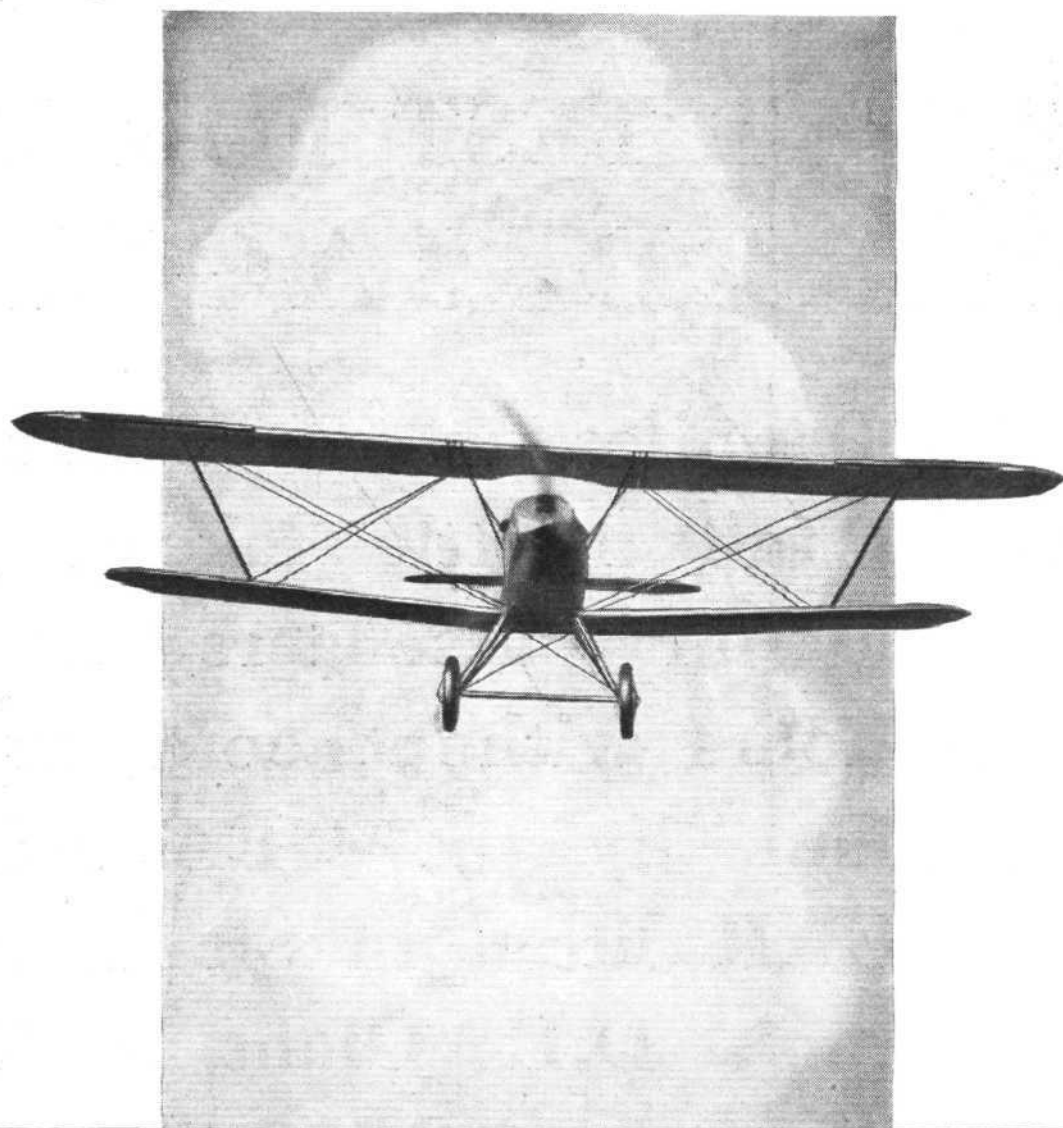
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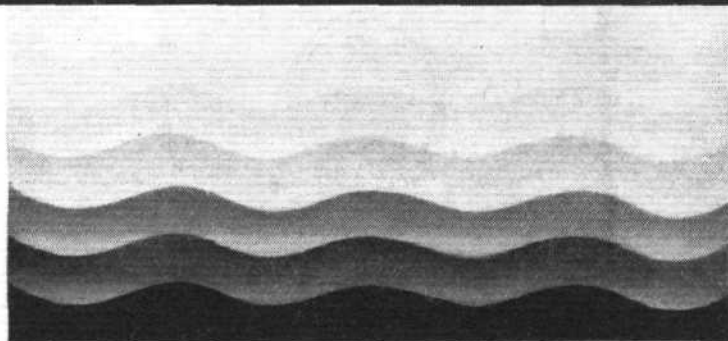


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600 HOURS WITHOUT OVERHAUL

D.H. "Gipsy" Engine's Record

A TOTAL running time of 661 hrs. 5 mins., including bench tests, taxiing and running-up; a flying time of 600 hours, during which a distance of approximately 51,000 miles was flown; a petrol consumption, on Pratt's No. 1, of 2,644.5 gallons, equivalent to 4.5 gallons per hour, or 19.5 miles per gallon; a total oil consumption of 294 pints of Castrol XXL, equivalent to 0.45 pint per hour, or 1,400 m.p.g.; average cost of petrol and oil for 51,000 miles, 1d. per mile flown. These are the statistics which represent the results of the reliability test of a de Havilland "Gipsy" engine recently concluded. Before the test was begun the engine, one picked at random from stock, was carefully sealed to ensure that no part should be changed without the change being known. During the 600 hours' reliability trial the only change made was one magneto, the impulse starter bush of which had swelled. A repair could have been made instead, and this would have been the case if the engine had been installed in the machine of a private owner. In this instance, however, it was thought wiser to change the magneto. At the end of the 600 hours' test the engine was put on the test bench and a power curve taken. It was found that the engine developed 92.3 b.h.p. at 2,050 r.p.m., as compared with 94.7 b.h.p. before the commencement of the 600 hours' test. An estimate was obtained for the cost of replacing such few items as required renewal, and this amounted to no more than £7 2s. 11d. Put in another way, the cost of replacements, after 51,000 miles, works out at approximately 1d. for every 30 flying miles! Pessimists who cannot see aviation ever equalling motoring would do well to study these figures.

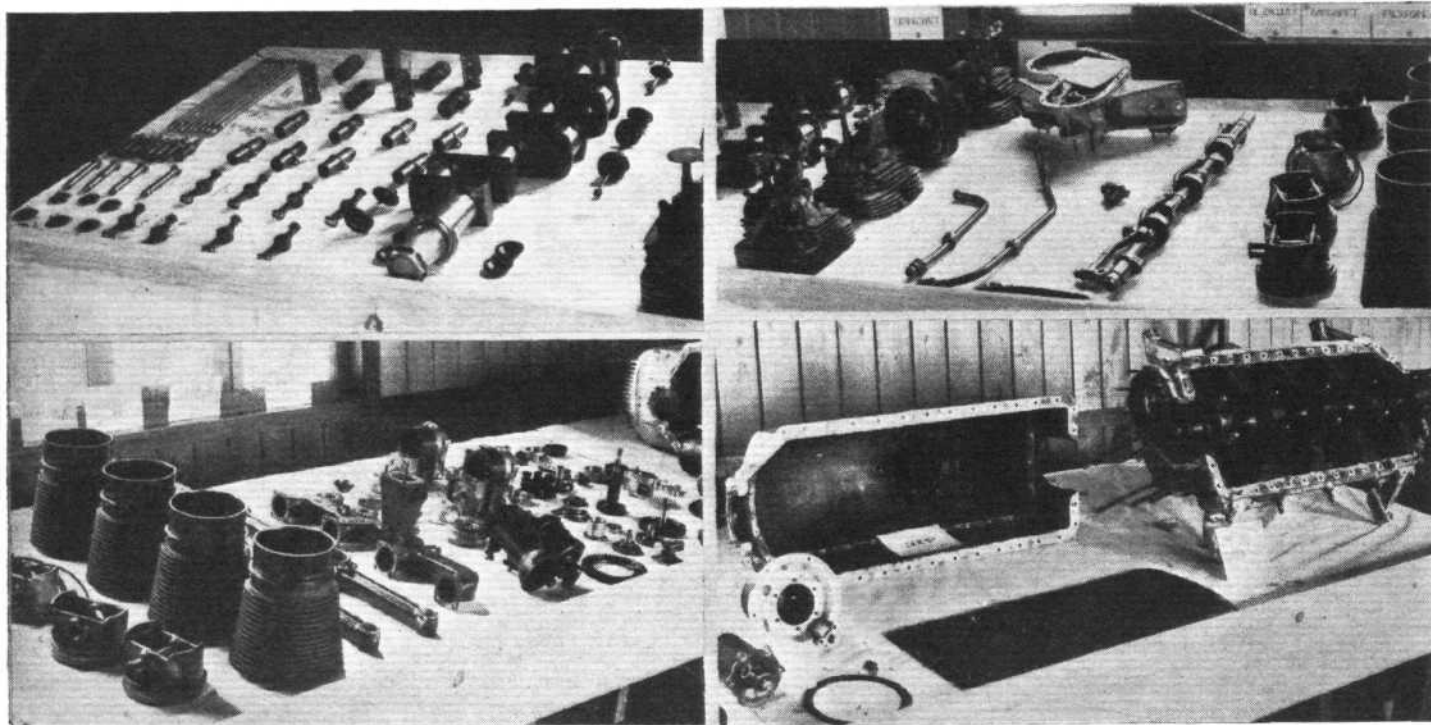
Although the history of the de Havilland "Gipsy" engine is probably known to a large proportion of our readers, it is thought that a brief summary here may be of interest. The original "Gipsy" engine was designed jointly by Major F. B. Halford and Captain G. de Havilland. The first engines were designed to give 135 b.h.p., and were put through very searching tests. Of these it will suffice if we recall that one was installed in the tiny "Tiger Moth" de Havilland monoplane, which established a world's speed record in its class with an average speed of no less than 186.5 m.p.h., while the same machine and engine attained an altitude of more than 20,000 ft. The tests were continued until the

designers were satisfied that every component possessed an adequate factor of safety. The engine was then de-tuned to give 100 b.h.p. This was done by lowering the compression ratio (thereby incidentally permitting the engine to be operated normally and regularly on No. 1 petrol) and by fitting rather smaller valves. The components which had stood up to the original power were, however, retained. This procedure was rather the reverse of the normal, which consists in "boosting" an engine for special racing purposes.

The Reliability Trial

When it was decided to put a standard "Gipsy" engine through a 600 hours' reliability trial, an engine was taken at random from stock and installed in a "Moth" aeroplane. Officials of the Air Ministry Aeronautical Inspection Directorate sealed a number of parts as follows:—The carburettor was sealed to the induction pipe, which was in turn sealed to the cylinder heads. The valve rockers and cylinder heads were sealed to the cylinders, and all four cylinders were sealed together. Finally, the magnetos and oil pump were sealed to the crankcase, the two halves of which were sealed together. In short, it was made impossible to carry out any work on the engine or to make any adjustments without breaking the seals.

The machine was officially sealed on December 28, 1928, and the actual flying tests started the next day. The intention was to run the engine for a total of 600 hours in the air without overhaul, repairs or replacements, the "Moth" to cruise as far as possible at a constant speed of 85 m.p.h. This constant speed was chosen partly in order that, knowing the number of hours flown, the mileage might be at any rate approximately assessed. For nine months the machine has been flown at every possible opportunity by a number of different pilots, its times and consumptions being carefully logged. With the exception of the magneto change already referred to, and which could quite well have been avoided, the engine has run faultlessly, and the attention given to it has been confined to the routine cleaning of filters and sparking plugs, checking of contact breaker and valve clearances. Throughout the mileage of 51,000 miles no trouble whatsoever has been encountered. Replacements are confined to such parts, inexpensive and easily renewable



AFTER 600 HOURS WITHOUT OVERHAUL: The de Havilland "Gipsy" engine dismantled for inspection. It is estimated that replacement of worn parts would cost only £7, which corresponds to 1d. per 30 miles flown! ("FLIGHT" Photos.)

as must be expected to show slight wear under prolonged service. Comparing the performance with that of the average motor car engine, the mileage flown represents something like five years of car mileage (at 10,000 miles per year), without failure, without overhaul, and even without decarbonising.

The condition of the engine after the test, as revealed by a very careful examination of the individual components, is extremely satisfactory. The wear on the following items was found to be within the manufacturing tolerances, in other words, up to the demands required for a certificate of airworthiness: Main bearing bores of crankcase; crankpin diameters; cam profiles and bearings of camshaft, big and small end bores of connecting rods; diameter of gudgeon pins; bores, ovality and parallelism of cylinders, diameters of rocker bracket spindles; bores of valve rockers; tappet diameters; wear and backlash in timing gears; clearances in gears and bushes of oil pump.

The items requiring renewal, and for which the cost estimate just exceeds £7, are as follows: 8 piston and scraper rings (worn); 1 piston (broken piston ring "land"); 8 valve guides (worn); 8 valve rocker bushes (worn); 8 valve rocker adjusting screws (worn); 2 valve push rod tubes (worn by rubbing on cowling); 1 oil pipe nut (fractured); 1 carburettor float (distorted); 2 carburettor balance weights (worn); 2 carburettor throttle spindle bushes (worn); 1 magneto carbon brush (worn); 1 high-tension lead; 4 cylinder head gaskets (always replaced on overhaul); and the induction pipe repaired.

Designer's Comments

Maj. Halford, co-designer with Capt. de Havilland of the "Gipsy" engine, makes the following comments on the parts which were found, after 600 hours' running, to need replacement:—

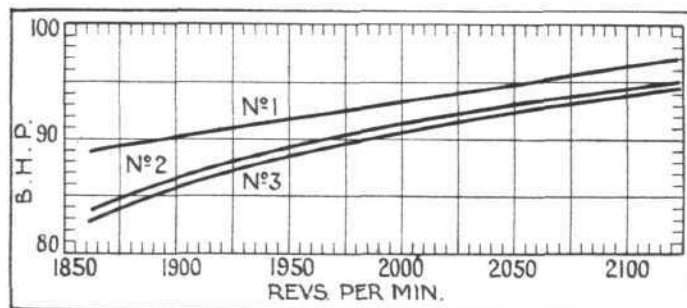
"The wear experienced in piston and scraper rings appears to be about normal, and it is difficult to see how to lengthen the life of these rings appreciably, bearing in mind that they must remain capable of keeping the oil consumption down to half a pint per hour.

"The exact cause of the broken 'land' on one piston is not known. It appears to be an isolated case, based on the experience of other 'Gipsies.'

Canadian Pacific Express Air Services

THE Canadian Pacific Express Company have now concluded arrangements with the Air Express Company, Limited, whereby they can supply a private All-metal Junkers Limousine Monoplane to carry four passengers, for either long or short distance business trips, from London to

"The wear on valve guides, rocker bushes, and adjusting screws is probably normal under the circumstances, but the life of them does not compare favourably with the rest of the engine. Modifications were already in hand before the completion of this test, and these modifications now treble the life of these parts. The remaining items call for no particular comment, although none will be neglected, however small.



POWER CURVES OF THE "GIPSY" ENGINE: No. 1 is the original acceptance curve. No. 2 after 500 hours' running, and No. 3 after the conclusion of the Reliability trial. Barometer readings for the three curves were: (No. 1) 763 mm.; (No. 2) 767 mm.; (No. 3) 770 mm. Curves have been corrected for barometer only.

"Considering the number of hours' run, the absence of carbon deposit, both inside the cylinder heads and in the crowns of the pistons, is most satisfactory. In no place does it exceed 0.012 in. (twelve-thousandths of an inch)."

These results speak eloquently for themselves, and it is unnecessary for us to add anything to them, beyond very hearty congratulations to the de Havilland company on what is undoubtedly an extremely fine performance. The reliability test should increase the already very good reputation of the "Gipsy" engine.

points in Europe. The machines have an 8-hour range at 110 miles per hour cruising speed. Baggage up to 400 lbs. weight is allowed free. The monoplane can also be hired for the fast transport of freight, taking up to 2,000 lbs. load. This new arrangement is but an extension of the Canadian Pacific Express Company's aerial activities.

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PERFORMANCE FIGURES

ATLAS WITH JAGUAR ENGINE AND TOWNEND RING

Fuel, 75 gallons (337 litres). Oil, 7 gallons (32 litres). Military Load, 880 lbs. (400 kgs.)

	Plain Engine.	Geared Engine		Plain Engine.	Geared Engine.
Approx. total weight	4000 lbs.	4115 lbs.	Time to 5000 ft.	5.25 minutes	4.25 minutes
	1820 kgs.	1870 kgs.	" " 10000 ft.	12.5 "	10.5 "
Speed at ground level	143.5 m.p.h.	149 m.p.h.	" " 15000 ft.	26 "	21.75 "
	231 km.p.h.	240 km.p.h.	" " 10000 mtrs.	3.5 "	2.5 "
" " 5000 ft.	139.5 m.p.h.	145 m.p.h.	" " 3000 "	12.5 "	10.25 "
" " 10000 ft.	134 m.p.h.	140 m.p.h.	" " 5000 "	34 "	27.5 "
" " 15000 ft.	125 m.p.h.	131 m.p.h.	Absolute Ceiling	19000 ft.	19100 ft.
" " 1000 metres	226 km.p.h.	236 km.p.h.		5800 metres	5830 metres
" " 3000 metres	216 km.p.h.	225 km.p.h.	Service Ceiling	17300 ft.	17700 ft.
" " 5000 metres	193 km.p.h.	204 km.p.h.		5280 metres	5400 metres
	Maximum allowable R.P.M. 2200. Normal R.P.M. 2000				

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT LIMITED
Works and Aerodrome : Whitley, Coventry. London : 10 Old Bond Street, W.1

AUSTRALIAN EAST-TO-WEST AIR RACE SWEEPING SUCCESS OF DE HAVILLAND AIRCRAFT

The Australian trans-continental air race from Sydney to Perth, which started on September 30th and finished 6 days later, proved an outing for no less than five types of de Havilland aircraft and an overwhelming triumph for the Gipsy Moth.

FASTEST TIME = GIPSY MOTH

Pilot—Major H. de Havilland — averaging 107 m.p.h. for the 2,450 miles.

2nd = DH. 50.

3rd = DH. 9.

On handicap the results were :

FIRST = DH. 9. = PILOT : Captain A. C. MILLER.

SECOND = GIPSY MOTH PILOT : Major de HAVILLAND.

THIRD—GIPSY MOTH FIFTH—GIPSY MOTH
FOURTH—GIPSY MOTH SIXTH—GIPSY MOTH

The race was one of the most severe ever held, wind, rain and dust-storms being encountered all the way

10 GIPSY MOTHS STARTED = 9 FINISHED

(the remaining machine hitting a tree in dense fog). The nine finished in perfect condition after being flown at full throttle throughout the 2,450 mile race.

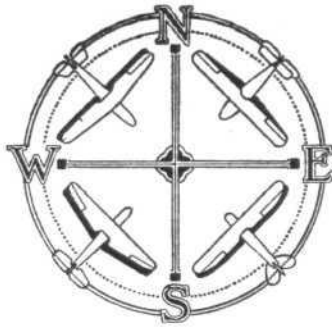
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AIRISMS FROM THE



FOUR WINDS

Lady Bailey Flies to Scandinavia

LADY BAILEY left Croydon Aerodrome in her D.H. "Moth" on October 12 for a flight to Oslo. She reached Amsterdam that afternoon, and proceeding next day, landed at Copenhagen; on October 14 she got as far as Gothenburg, but bad weather prevented her flying to Oslo, and she continued her journey there by train.

Mr. Carberry Flying to Africa

MR. JOHN CARBERRY left Le Bourget on October 8 en route for Africa, and landed at Bron, near Lyons.

New Venture on the Southern Cross

CAPT. KINGSFORD SMITH is planning a flight from Europe to Santa Maria, California, on the *Southern Cross*.

"Graf Zeppelin"

PILOTED by Dr. Eckner, the *Graf Zeppelin* left Friedrichshafen at 11 p.m. on October 12 with 22 passengers on board, and flew to Holland. The following morning it passed over the Royal Palace at Loo, and visited Groningen, Rotterdam, the Hague, and Amsterdam. The airship returned to Friedrichshafen in the afternoon. On October 15 the airship set out once again, at 8.20 p.m., for a tour of the Balkans and Silesia; she will probably land at Breslau. Dr. Eckner has conferred with the crew of *Graf Zeppelin* regarding the proposed Polar flight, and it is reported that the majority of the crew have expressed their unwillingness to take part in the venture.

Land of the Soviets

THE Russian aeroplane *Land of the Soviets*, engaged on a flight from Moscow to New York, is safe after all. Reports are somewhat vague as to her recent movements, but apparently she reached Waterfall, Alaska, where a new engine was installed. On October 13 the machine landed at Seattle.

Lindbergh's Discovery

DURING his air tour of Central America, Col. Lindbergh has discovered the ruins of a majestic Maya temple and three ancient cities in a jungle of Honduras.

"Windmilling the Channel"

A CIERVA Autogiro, piloted by H. A. Rawson, flew from Paris to Lympne, via Boulogne, on October 10.

Lady Heath

WE learn that Lady Heath continues to make good progress, and has probably, by now, left hospital. As yet it is too soon to know if she will be able to fly again—as she wants to do—but after a few months' rest it is hoped she will have completely recovered.

Portsmouth Loses on Schneider Trophy

THE Portsmouth Corporation Schneider Trophy Committee report a net loss of £2,715 in connection with the erection of stands, parking places, etc., for the recent Schneider Trophy contest. They add, however, that the immense publicity afforded the city, the benefit of which cannot be measured in pecuniary terms, more than justifies the expenses incurred.

French Seaplane Mishaps

A SEAPLANE on the French Marseilles-Algiers air mail service fell into the sea on October 9, and the crew and mails were saved by the liner *Tringad*. Another French seaplane, with three passengers, was forced down off the coast of Sardinia on October 6, and here also the passengers, mails, and crew were rescued by the Italian warship *Il Duce*.

Aerobatics Ban in Czechoslovakia

THE Czechoslovak Ministry of National Defence has forbidden aerobatics by military airmen, on the ground that they endanger life and property.

Air Mails to South America and Norway

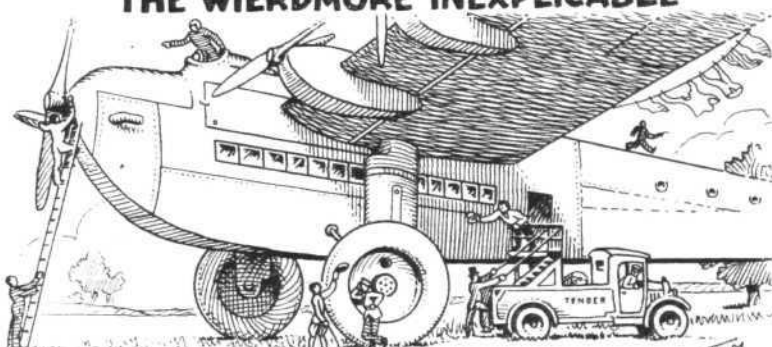
THE Postmaster-General announces that, beginning with the mails despatched from this country on October 12 for conveyance to New York by the *Aquitania*, Air Mails for Central America, Ecuador and Peru will be despatched for conveyance by air from New York. All classes of postal packets, except parcels, may be sent. Packets may be registered, but not insured. The countries served, the approximate gain in the time of transmission over the ordinary service, and the air fees to be prepaid by ordinary postage stamps, in addition to the ordinary postage and registration fee, if any, are as follows:—British Honduras and Honduras Republic (5-10 days), 1s. per half-ounce; Nicaragua (8-11 days) and Panama and Canal Zone (3-6 days), 1s. 4d. per half-ounce; Ecuador (5-7 days), 2s. 3d. per half-ounce; Peru (2-10 days), 3s. 6d. per half-ounce. Correspondence for transmission by this service may be posted in the ordinary way, but must either bear in the top left-hand corner the blue air mail label, or be clearly marked "By Air Mail." The latest time of posting in London is the same as that for ordinary correspondence for the United States of America. It is also announced that, in consequence of the suspension during the winter season of certain connecting air mail services, the Parcel Air service to Norway has been discontinued until further notice.

Farthest North Air Mail Service

IN November next an air mail service will be inaugurated between McMurray, Alberta, and Aklavik in the North-West Territories. McMurray, Alberta, is the present terminal of the Alberta and Great Waterways Railway recently incorporated in the Canadian Pacific Railway system with joint ownership by the Canadian National Railways. The new service will almost parallel the historic fur trader's trail for nearly 2,000 miles north and north-west along the Athabaska, Slave and Mackenzie Rivers, bringing this remote but important region of Canada's vast northland within comparatively easy reach of the main arteries of traffic. There will be 14 points of call on the route including Fort Resolution on the Great Slave Lake, Fort Good Hope on the Mackenzie River, and terminating at Aklavik in the Mackenzie delta.

PLANES WE DREAM ABOUT!

THE WIERDMORE 'INEXPLICABLE'



GIANT, MULTI-ENGINE, CANTILEVER, HIGH-WING MONOPLANE
 ...CARRIES 200 PASSENGERS... CREW SLEEP IN HAMMOCKS IN
 HOLLOW WINGS... IN STRONG WINDS, EXTRA ENGINES CAN BE SLID
 ALONG WINGS... TOO HEAVY TO FLY... TAXIS TO HER DESTINATION.

With apologies.

PRIVATE



FLYING

A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

LEEDS AND BRADFORD MUNICIPAL AERODROME

AT a luncheon given by Lord Brotherton at the Queen's Hotel, Leeds, on Friday, October 11, it was fore-shadowed that within six months the proposed Municipal Aerodrome for the joint use of Leeds and Bradford would become an established fact. The lunch, which was to mark the amalgamation of the Yorkshire Aero Club with National Flying Services, Ltd., was attended by several well-known people in the flying world and also those representing local interests; amongst those present were Lord Brotherton—President of the Yorkshire Aero Club—the Lord Mayor of Leeds—Alderman D. B. Foster—the Lord Mayor of Bradford, Lady Bailey, Air Vice-Marshal Sir Sefton Brancker, Lt.-Col. I. A. E. Edwardes, Col. the Master of Sempill.

Lord Brotherton in proposing the toast, "The Amalgamation of the Y.Ae.C., Ltd., with the N.F.S., Ltd.," said that he was happy to entertain such a distinguished gathering on such an occasion, and although it marked the passing of a local institution, he was sure that in becoming part of N.F.S., the club would not lose its identity, but would benefit in every way. The Club, he said, had done a great deal to educate the public in air-mindedness and though they had had a hard time since they started in 1923, they had this year showed a profit. They had now 168 flying members, 116 associate members, and 48 lady members. The staff had worked very hard and the club had a record which N.F.S. should be proud to take over. Business men, he said, were taking a keen interest in the club and they were in one accord in wanting an aerodrome closer to the town which could serve as a Municipal Aerodrome, but more would be said about that later. Leeds, if it is not to be left behind, must follow the suit of Hull, and he would now call upon Col. Edwardes to put before them in his response the actual position they would have on N.F.S. taking over.

Col. Edwardes, the Managing Director of N.F.S., thanked Lord Brotherton for agreeing to continue as the President of the Club and also for his hospitality on this occasion. He assured everyone that the Club would not lose its identity on N.F.S. taking over, and that he sincerely hoped they would be able to work in conjunction with the Municipality on an aerodrome closer to the City as soon as possible. He then outlined the aims of N.F.S. and pointed out that although it sounded a lot, the area involved was really small, in fact, there was a greater area already used for golf courses than they proposed to use for aerodromes, and while flying is a necessity, golf is merely a pleasure, a beneficial one, no doubt, but at the same time not a necessity. The business men of Leeds were shrewd and wanted to push trade all they could and to do so they must have rapid means of communication, flying would give them this and he had no doubt that they would give the whole project their full support. Sir Sefton Brancker, he said, could easily spend millions on air routes and were he able to do so, he was sure that it would do far more good than the same amount spent on roads as was being done. They must have the support of the politicians who, in turn, must have the support of the country, and this was where flying clubs came in, in making the man in the street air-minded. All Club members should consider themselves salesmen with a duty to sell aviation. It is the personal touch which is needed to make people take a thing up, and he hoped before very long we should have tall yarns of flying just as we now have our fishing and golf yarns.

The idea that flying was mad, wild or dangerous was sheer nonsense and had to be eradicated. Flying, he said, was purely a means of transport, and as such N.F.S. were doing their best to develop it in the interests of trade. Air taxis were already in great demand and when they had aerodromes and landing grounds about the country as frequently as they had on the Continent, then they could anticipate a much larger demand. Statistics showed that 25 per cent. of the passengers who arrived at Croydon by

the Royal Dutch Line wished to travel direct up to Leeds and this district, but, he said, where could they conveniently land? Sherburn was much too far away and they must have a better aerodrome close where the means of transport is direct and fast to the City.

In conclusion, he would like to thank Lord Brotherton, he said, for the great assistance he had given to aviation, and he hoped that more men would follow this example.

In proposing the toast of "Air Ports," Sir Sefton Brancker first tendered the apologies of Lord Thomson, who was unable to be present. He said he had been asked to say a few words on air ports, and with a view of getting some interesting material he had been looking at some old copies of *The Times* about 80 years old. Here he found the mention of Royalty travelling by the most modern methods, as some of our Royal Family were doing today.

Queen Victoria, said the paper, was admired for travelling from London to Slough by train, but it was suggested that this high speed entailed too much danger for Her Majesty, and it was hoped that she would not make a practice of doing so! Flying, he said, was forced upon us by virtue of our geographical position, and this means of communication with our overseas dominions must be advanced at all costs. To do so they must have air ports at all chief cities, and it was up to those cities to see that when they had regular air lines running they kept the machines full to capacity with their merchandise. In America they have made a success of running such lines, and the method they worked on was to let the cities provide the aerodromes and their upkeep, while the Government looked after the lines between these aerodromes and maintained the lighting and so on.

This, he said, was the scheme which N.F.S. were working on, and they were approaching many municipal authorities with a view to inducing them to provide aerodromes as soon as possible. He had, he said, been referred to today as the Director of Civic Aviation, and he would like to point out that this was not his title; he was the Director of Civil Aviation, and Civic Aviation must look after itself—that was the job for municipal authorities. Leeds had been slower than Hull in this matter, and now they must catch up; they could be sure, he said, that the Air Ministry would help in every way they could except financially! He would not go so far as Col. Edwardes and abolish golf courses and let men get their exercise by running round aerodromes, but he would like to see aerodromes growing up everywhere, and hoped that Leeds would soon have an aerodrome with traffic on, on the same scale as that at Croydon. In conclusion, he would also like to add his thanks to those already expressed to Lord Brotherton for his hospitality.

Maj. Milner, Chairman of the Leeds Corporation Improvements Committee, in responding, said that, first of all, he had been charged by the Lord Mayors of both Leeds and Bradford with most sincerely thanking Lord Brotherton for holding this lunch today. With reference to Sir Sefton Brancker's disappointment over the municipal aerodrome, he would like to say that in June last year a site at Yeadon was selected which would serve the interests of both cities. This site was confirmed by the Air Ministry, and they agreed to license it; representations were, however, put forward from other sources which made them think that perhaps, after all, it might not be the best site, and they had therefore engaged Sir Alan Cobham to report on it, as they felt that, being, as it was, such a large step, they could not afford to make a hurried decision. Sir Alan had promised to come up shortly, and as soon as his report was received—assuming it was favourable, which he had no reason to think that it would not be—they should then have no further delays, and the aerodrome should be ready in a few months. The actual work entailed would be small, the levelling would not be very much and there was only a little to be done in the

(Concluded on page 1126.)

British Air Triumphs

- 1918** A Napier-engined D.H. aeroplane climbed to a height of 30,500 feet in 66 minutes. At this time no human being had ever soared so high.
- 1919** A Napier-engined D.H. aeroplane won the Aerial Derby. Speed 129.3 m.p.h.
- 1921** A Napier-engined Gloster aeroplane won the Aerial Derby. Speed 163.4 m.p.h.
- 1922** A Napier-engined Supermarine flying-boat regained the Schneider Trophy for Great Britain at a speed of 149 m.p.h.
- 1922** A Napier-engined Gloster aeroplane won the Aerial Derby. Speed 180 m.p.h.
- 1923** A Napier-engined Gloster aeroplane won the Aerial Derby. Speed 192.4 m.p.h.
- 1926** The first non-stop crossing of South Atlantic ocean carried out by Commandante Franco, flying a Dornier flying-boat with two Napier engines.
- 1926** First formation flight from Cairo to Cape Town and back to England. Four Fairey aircraft, each fitted with Napier engine, covered 56,000 engine miles without trouble.
- 1927** Schneider Trophy won by a Napier-engined Supermarine-Napier seaplane flown by Flight-Lieut. S. N. Webster, A.F.C. Speed 281.669 m.p.h. Only two machines completed the course, both Supermarine-Napier seaplanes fitted with Napier engines.
- 1927** World's speed record over 100 kilometres set up by Flight-Lieut. S. N. Webster, A.F.C. Speed 283.313 m.p.h.
- 1928** Flight-Lieut. D. D'Arcy Greig, D.F.C., A.F.C., flying Supermarine-Napier seaplane, fitted with Napier engine, set up speed of 319.57 m.p.h.
- 1928** Capt. H. S. Broad, flying D.H. Hound, fitted with Napier engine, secured three World's speed records whilst carrying loads of 500 and 1,000 kilogrammes.
- 1928** The greatest formation flight ever carried out was made with four Supermarine-Napier Southampton flying-boats, each fitted with two Napier engines. The machines flew from England to Australia, round Australia and back to Singapore, covering 180,800 engine miles without mechanical trouble.
- 1929** The first non-stop flight from England to India was carried out with a Fairey monoplane fitted with Napier engine. 4,130 miles in 50 hrs. 38 mins.

NAPIER

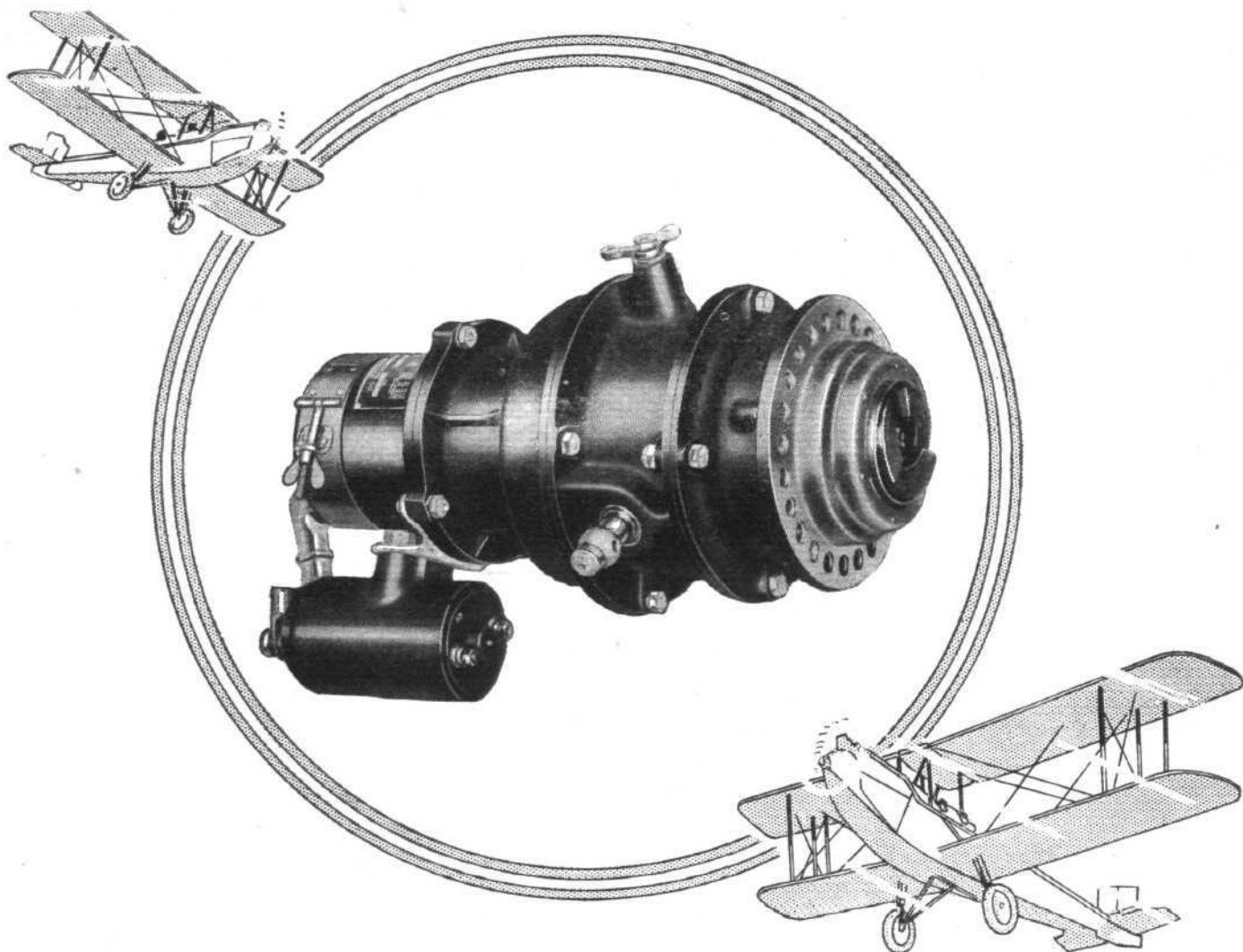
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No more hand cranking!

Quick and convenient starting of aeroplane engines is effected by means of the B.T.H. Inertia Starter.

Of minimum weight, and made for hand or electric-motor operation (the latter pattern being arranged for control from the pilot's cockpit), these starters impart a high initial cranking speed to the engine—about 80 r.p.m.—starting the engine in about 5 seconds with motor operation, or 15 to 30 seconds with hand operation.

Made in five patterns to suit engines from 1,300 cub. ins. to 2,500 cub. ins.

The illustration shows a Combined Hand and Electric Inertia Starter for Engines up to 1,300 cub. ins.

Full particulars will be supplied on application.

The British Thomson-Houston Co., Ltd.

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Alma Street

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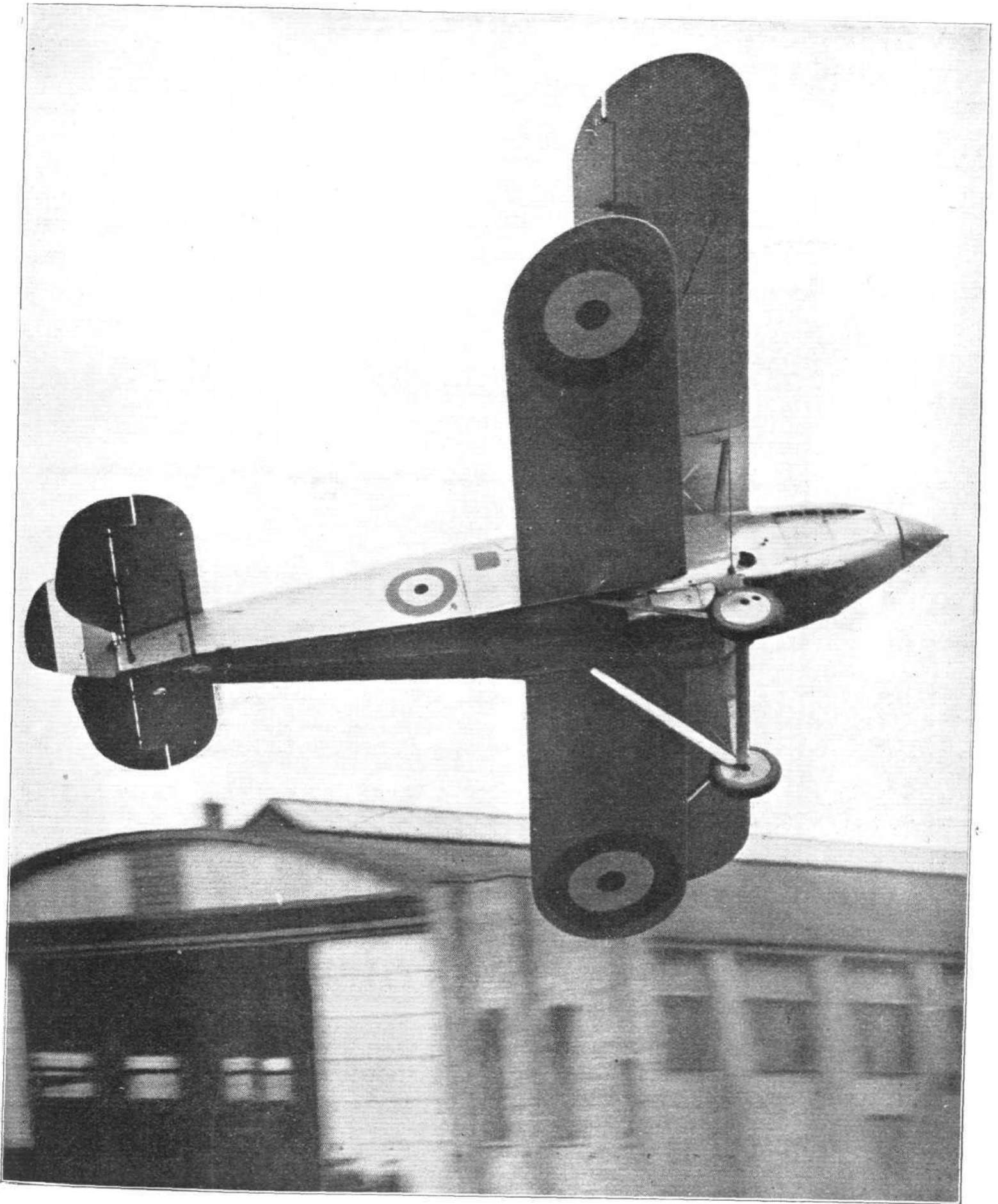
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Coventry

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The Hawker Hornet with Rolls Royce F. engine. The fastest single seater fighter in the world. ("FLIGHT" Photo.)

Save time by using the Air Mail.

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AIR LEAGUE CHALLENGE CUP
S.B.A.C. CHALLENGE CUP

ALL WO

At the Newcastle Meeting on Saturday
important CHALLENGE CUPS mentioned
conclusive triumph for Cirrus



GROSVENOR CHALLENGE CUP

AIR LEAGUE CHALLENGE CUP

S.B.A.C. CHALLENGE CUP

FASTEST TIME OF

CAPT. R. G. CAZALET ON A

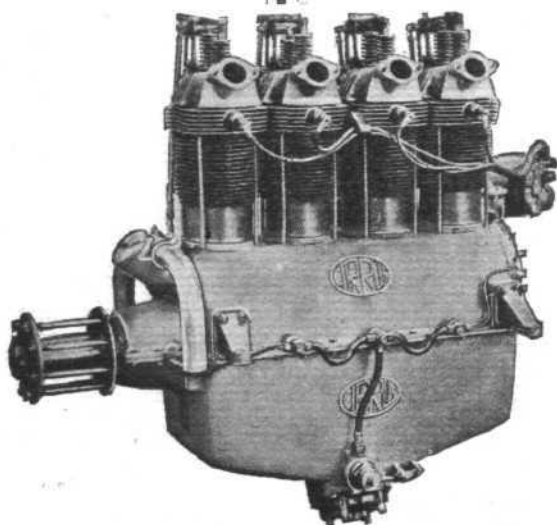
A FURTHER CIRRUS SUCCESS

At the opening of the HULL MUNICIPAL AEROPLANE RACE was won by Ft./Lt. Le Poer
CIRRUS-MOTH second and a CIRRUS-MOTH third

CIRRUS AERO

Regent

89, KINGSWAY,



85/95 h.p. CIRRUS MARK III.

Kindly mention "Flight" when corresponding with advertisers.

RACES ON CIRRUS ENGINES !

On 5th October, the races for the above took place, and resulted in a lined aircraft as follows:—

1 ST	G. S. KEMP	CIRRUS-MOTH
2 ND	Dr. H. L. B. DIXON	CIRRUS-MOTH
3 RD	A. GOODFELLOW	CIRRUS-AVIAN
4 TH	W. L. RUNCIMAN	CIRRUS-SPARTAN

1 ST	N. S. TODD	CIRRUS-MOTH
3 RD	F/O. S. A. THORN	CIRRUS-AVIAN

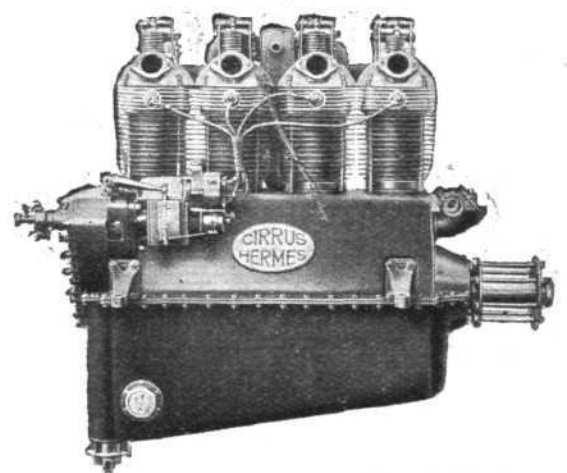
1 ST	Dr. H. L. B. DIXON	CIRRUS-MOTH
3 RD	D. WILSON	CIRRUS-MOTH

THE DAY WAS OBTAINED BY
HERMES—WIDGEON

WIDGEON won the KINGSTON-UPON-HULL LIGHT
Race on a CIRRUS HERMES-AVIAN, with a

ENGINES, LTD.

London, W.C.2.



105/115 h.p. CIRRUS-HERMES.

Save time by using the Air Mail.

THE ZENITH CUP



awarded for the fastest flight by a two-seater light aeroplane weighing under 400 kilogs. over the circuit Orly, Lyons, Marseilles, Toulouse, Bordeaux, Orly, a distance of 1037 miles

has been won for 1929 by
Capt. H. BROAD, flying a
GIPSY-MOTH
which averaged 112 m.p.h., using

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CASTROL
MOTOR OIL

C. C. WAKEFIELD & CO., LTD.,
All-British Firm,
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REYNOLDS

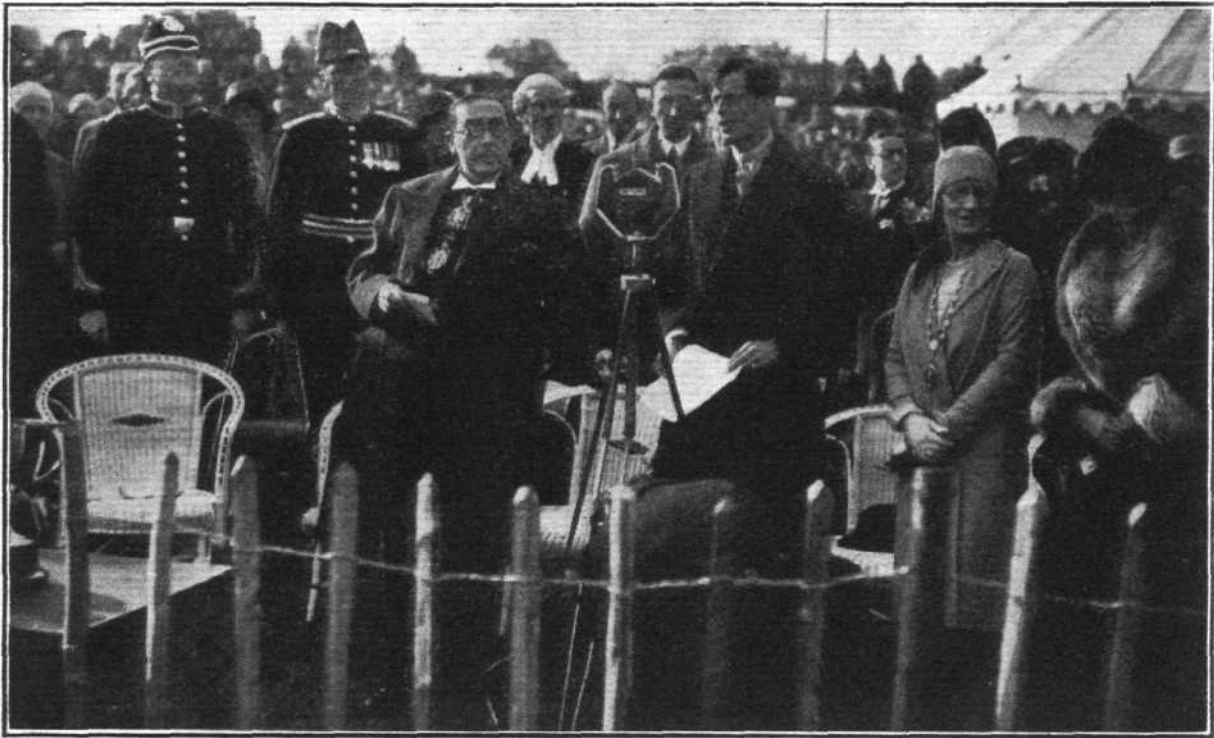
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Round and Special Sections, Taper Gauge, for Axles, etc. Manipulated Tubes of all descriptions, including Built-up Components (Welded). Anything in Steel Tubing for Aircraft.

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THE HEDON OPENING : Prince George before the microphone, with the Lord and Lady Mayoress either side of it, declares the Municipal Aerodrome open. ("FLIGHT" Photo.)

PRINCE GEORGE OPENS THE HULL MUNICIPAL AERODROME

HULL'S population enjoyed themselves on Thursday last, October 10, and they made no bones about doing so. The City was gaily decked with all manner of decorations and the general air of enthusiasm was very marked.

The Air Pageant itself was the terminating event of the opening of the Hull Civic and Empire Week by H.R.H. Prince George and immediately followed the official opening of the Municipal Aerodrome.

The Prince arrived at Brough at 11 a.m. in a Westland Wapiti piloted by Sqd.-Ldr. Don and escorted by Major Alexander and F/O. Stemp in a second Wapiti. After being received by Lord Deramore, the Lord Lieutenant of Hull and the East Riding, he made at our of the City, during which, he visited the St. Andrews Docks; the City Hall where he declared the Hull Civic and Empire Week open; the University College of Hull where he opened the college buildings; and after lunch at the Guildhall he drove to the Hedon Aerodrome.

In declaring the aerodrome open Prince George said, "It is with great pleasure that I accepted the invitation to open this aerodrome and though I had little experience of flying, I at once decided to increase my knowledge of modern methods of transport by undertaking the journey by air. It has been a most enjoyable experience and one which I hope to repeat when visiting other parts of the country."

The opening of this aerodrome is, I venture to say, one of the greatest strides in modern development that a City could take, and your Corporation is to be congratulated upon their resourcefulness and preparedness for what future requirements will surely demand. The history of the evolution of transport is indeed amazing, and education today has made it apparent to all that in future no city or town will be able to hold its own without adequate facilities for aircraft.

Your Corporation has acquired a splendid site in very close proximity to the City and the river Humber, and one can easily visualise a great future for the Air Port of Hull.

In congratulating your Corporation, I would also pay a warm tribute to National Flying Services, Ltd.—your tenants—whose scheme, which aims at instituting a chain of aerodromes and landing grounds throughout the length and breadth of the land, is deserving of every success.

It is most fitting that the opening of your aerodrome should be celebrated by the holding of the first Hull Air

Pageant, and I congratulate the organisers and all who are taking part in today's important event. I have much pleasure in declaring open the Hull Municipal Aerodrome and trust that this will not be the last occasion upon which I may use your air station." A rocket was then fired to denote the opening.

After representatives of the Hull Corporation Aerodrome Committee, National Flying Services, Ltd., organisers of the Air Pageant, and the Royal Air Force had been presented the Prince re-embarked in the Wapiti and left for Northolt.

The weather was not very kind and rain threatened most of the time; however, the only event which was actually stopped by the gusty wind was Mr. Trantum's parachute drop. This was a pity as few people at Hull have seen an air pageant and fewer still a drop.

The first event was a display by Capt. Blake on the "Lincock." This was quite up to the standard expected from this combination of pilot and machine, and the crowd, which, by the way, was very large and estimated at 80,000, showed their approval very vociferously. Capt. Blake is test pilot on land machines for Blackburn's at Brough.

The Kingston-upon-Hull Aeroplane Race was the next item, and this produced seven entries. It was a handicap, short lap race, having five laps, making a course of about 30 miles.

The entries were:—

Pilot	Machine	Starting Time
Flying Officer A. F. Scroggs	D.H.53 (Cherrub III)	14.00
Norman Blackburn	Bluebird (Genet)	14.02
Capt. Percival	Avian (Cirrus III)	14.05½
R. Kemp	Moth (G-EBPT)	14.05½
	(Cirrus II)	
Flight-Lieut. Wheatley	Moth (Hermes)	14.06½
Flight-Lieut. Trench	Avian (Hermes)	14.08
R. G. Cazalet	Widgeon (Hermes)	14.08

Flight-Lieut. Trench was first and Mr. Kemp second. This caused great jubilation in the "Hermian" camp, and has, we trust, broken the long sequence of rather bad luck that has been the lot of this new engine.

During the opening ceremony Flight-Lieut. Webster had been flying the "Inflexible" around (no doubt with the idea of having a change from slightly faster machines). He took



THE AERODROME ENTRANCE : The Hangar is the first permanent building and the Club house, to the pattern shown in last week's issue of "Flight," will be erected shortly. ("Flight" Photo.)

off with a very short run, and made a perfect landing in spite of the bumpy weather.

Thereafter came the R.A.F. Display. This was by 29 Squadron, and was the same in its main essentials as the display they gave at Cramlington the week before. The Squadron under Sqd.-Ldr. M. L. Taylor, was flying Armstrong Whitworth Siskins, and they started with an exhibition of formation flying. All the usual formations were faultlessly demonstrated, in spite of the bumpy weather; the Echelon to the right was particularly well carried out, and from the spectacular point of view is certainly one of the most attractive. It was unfortunate that the super-charger of one machine packed up, and caused the pilot to land, but the remainder carried on, and this incident did not really mar the show.

Flying Officer J. Clarke, who was substituting for Pilot Officer R. W. Letchworth, gave an exhibition of aerobatics as event No. 2. His masterly control of his machine has been shown at several other shows, including Hendon, and no one could have put up a better show. There was a subtle artistic touch about all his manoeuvres, which invariably impressed even the most blasé spectators, and never did he fly as if with brute force, as some pilots appear to do, but rather did he seem to retain perfect control while letting the machine fly itself.

As at Newcastle the programme was illustrated with diagrams of all the manoeuvres, which made it all the more interesting for the tyro to flying matters.

Event 3 was an aerial combat between Flight-Lieut. O. E. Worsley and Pilot Officer N. E. White. This is one of the most difficult spectacles to make convincing, and both pilots are to be congratulated on the way they managed to do so. Flight-Lieut. Worsley was unfortunate in being shot down without the satisfaction of a trail of smoke from his tail, but the apparatus refused to function when required.

Event 4, a converging attack on an encampment, was carried out by Flight-Lieut. E. Brewerton, Flying Officer J. Clarke, Pilot Officer N. E. White and Sergeant T. W. Morton. The "encampment" had been set up on the aerodrome well in view of all spectators, and the attack started off with

converging bombing. This was extremely accurate, and several direct hits were made. After the camp was burning well, it was machine-gunned to finish it off.

Flying Officer Clarke and Sgt.-Pilot Morton then gave a demonstration of combined aerobatics. They gave much the same show as they gave at Hendon, and the fact that they were good enough for there should be sufficient criterion of the excellence of their performance.

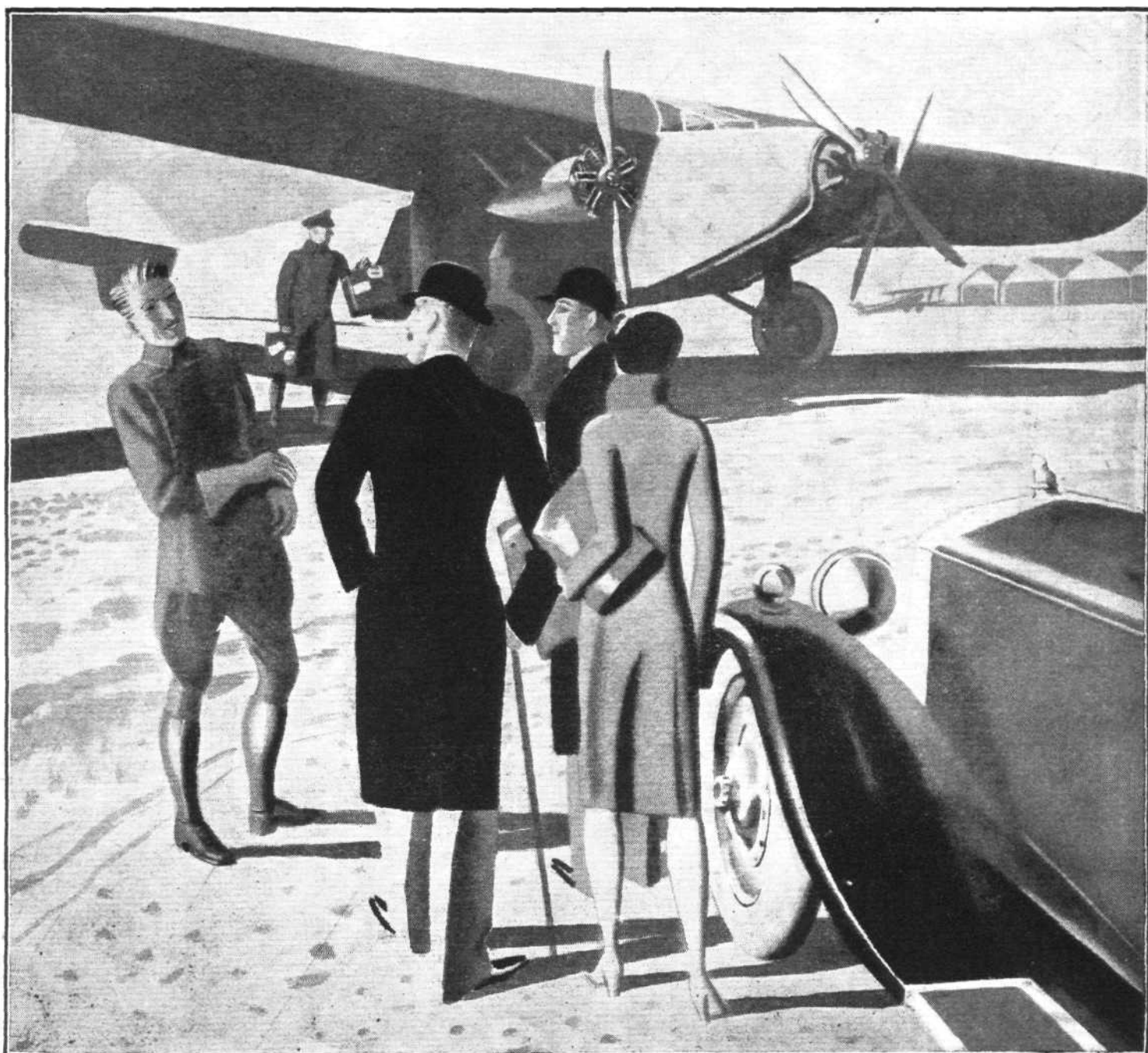
The next event should have been wing walking and a parachute descent by Mr. Trantum, but as has been already explained, the weather prevented him doing this.

Three N.F.S. Moths then proceeded to bomb an Austin car. It was unfortunate for them, perhaps, that they should have had to do this subsequently to the R.A.F. bombing display, because criticism is apt to be harsher and spectators less able to fairly judge the show when it is following such a Service demonstration. However, the event was quite amusing, which is what it is intended to be, even though direct hits were not obtained, much to the disappointment of one small boy, who asked his fond parent why they didn't throw the little bags into the car instead of on the ground.

Capt. Stack then gave one of his inimitable aerobatic displays on his own Hermes Moth. His flick rolls are real flick rolls, and there is no hesitancy in the way he throws his machine about.

The final event was a display of formation flying by the N.F.S. Circus of Moths. This little formation of three is now becoming well known, and though the light 'plane is by no means an ideal machine with which to do tight formation flying, especially such things as loops, they always put up a pretty show, but again it was naturally unfortunate for them in that they were rather overshadowed by the R.A.F. display, and the public, who were not educated in the niceties of flying were left to criticise without being aware of the limitations of the machines as compared with single-seater fighters.

During the morning a local product returned to its native city in the shape of the "Iris III." This was the machine which took Sir Philip Sassoon for his round trip



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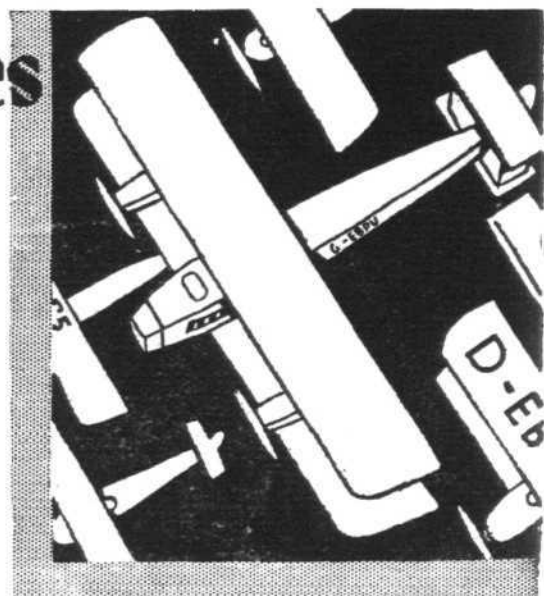
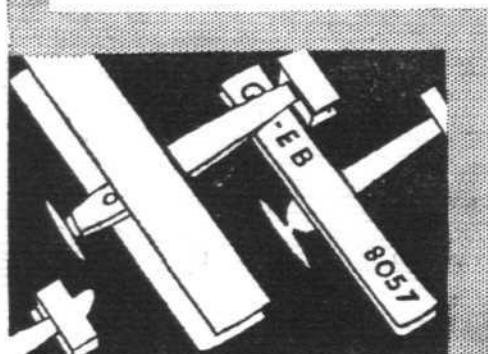
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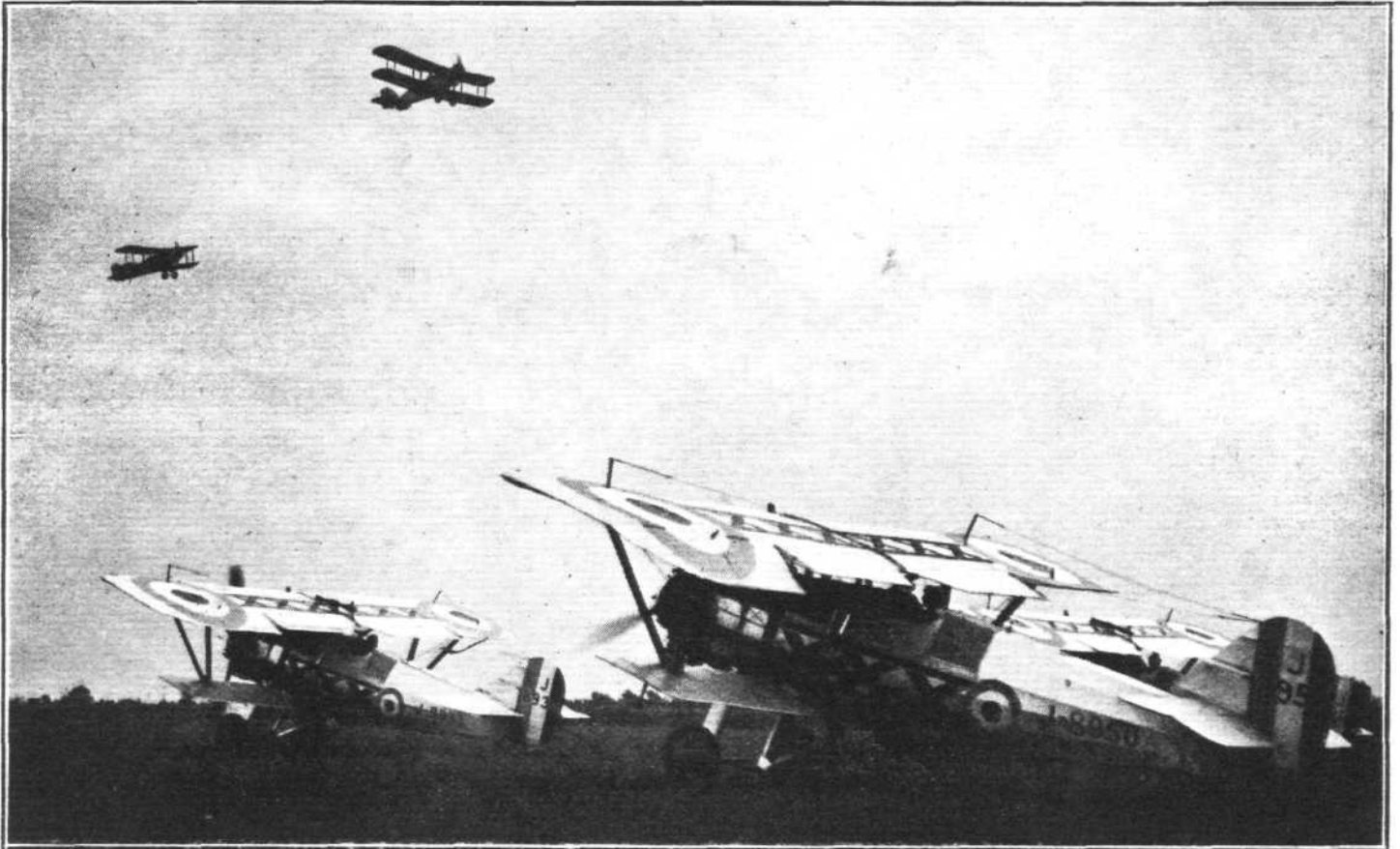
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OUR LATEST ROYAL POTENTIAL PRIVATE OWNER : Prince George and his escort machine—both Westland "Wapitis"—leaving for Northolt. ("FLIGHT" Photo.)

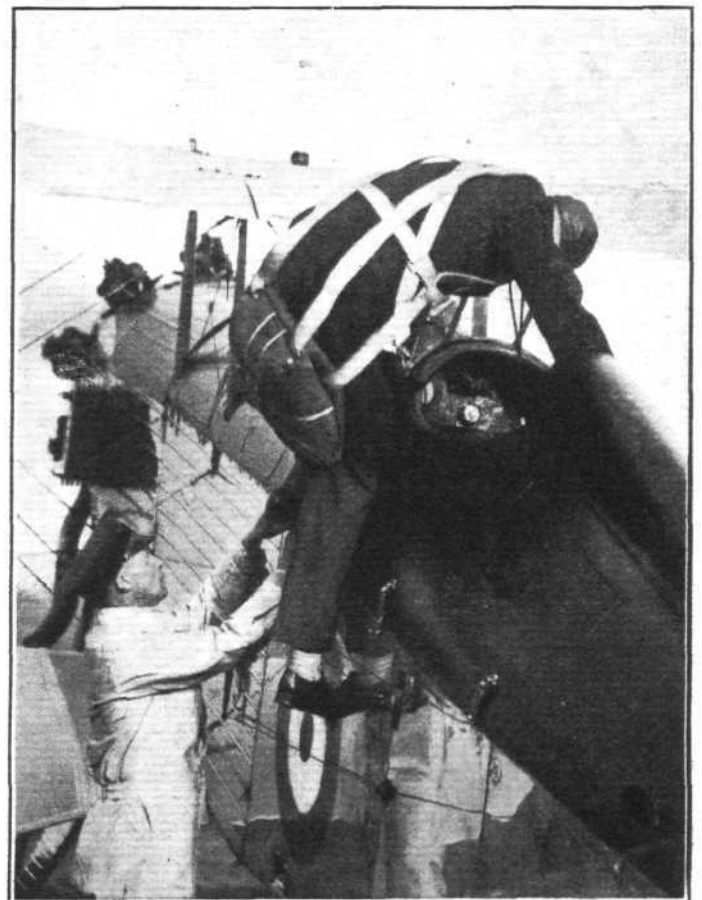
of the eastern stations and to India, and inspired him to write the Third Route. She was flown by Flight-Lieut. C. H. Cahill and Flight-Lieut. N. H. Woodhead, the latter being flying-boat test pilot to Blackburn's. One was privileged to make the trip in her, and to anyone who, like oneself, has not flown in flying-boats since the days of the F.2A, the progress that has been made when it comes to taking-off, landing, and taxiing is very marked indeed. It was by no means an ideal day, and even in the river there was quite a considerable loup on, so much so that getting alongside called for a scrambling leap from a dingy, which threatened to stave in the metal hull.

The "Iris" handles both on the water and in the air really beautifully, and even in the tideway of the Humber there is no great difficulty experienced in taxiing. The actual flight lasted some 40 mins., during which we flew down to Brough, where the Prince had landed, and then back along the river and over the docks to Hedon Aerodrome.

The aerodrome lies about 10 miles east of Hull and is within easy gliding distance, at normal heights, of the river. Even at that early hour—11.30 a.m.—there were already several growing streams of people wending their way to the Pageant, and large numbers gathered along the river to cheer as we returned. On coming down, the efficacy of the deeply flared keel showed itself, as even allowing for the modesty of the pilot who said she was easy to land, and in spite of the state of the river, we landed so that the moment of contact was almost imperceptible. The return trip was a very great contrast to our smooth flight and landing, and anyone who does not love the sea would have been more than glad to have seen the back of that motor boat. One would imagine that the arrangements for disembarking passengers will, when very large flying-boats come into general use, present a pretty problem.

In the evening, the Lord and Lady Mayoress—Councillor and Mrs. Benno Pearlman—gave a dance to the officers of the Royal Navy, and Royal Air Force, and the visiting pilots. Quite a formal note was lent by the officers wearing mess kit and it was a most enjoyable show; the hospitable record of Hull was certainly kept up, and the host and hostess deserve the most grateful thanks for providing such a pleasant evening and for the way they looked after the creature comforts of their guests.

One cannot leave the meeting without a mention of its tragic sequel next morning, when, on taking off at Brough,



ROYAL SAFEGUARDS : Prince George getting into the cockpit before leaving. In accordance with the regulations it will be seen that he is wearing a Service parachute. The fairing, windscreen and aluminium side panels of this machine, which was specially built for this type of work, should be noted. ("FLIGHT" Photo.)



TEAM WORK'S JUST REWARD : Flight-Lieut. de Le Poer Trench holding the Cup which he won in the Kingston-upon-Hull Light Aeroplane Race. A victory which was largely made possible by the keen interest and hard work put in by the A.D.C. ground staff. ("FLIGHT" Photo.)

Flying-Officer J. Clarke crashed and lost his life. He was so universally liked and admired for his Service record and his effort in building his "Cheetah" that his death must have been a very severe shock to all his friends, and quite

apart from his loss to the Service as a brilliant officer and pilot, he will be a loss to the world in general, which can ill afford to lose those whose presence makes one feel that life is more worth living.

AN APPRECIATION

ON Friday, October 11, when taking off in an Armstrong-Whitworth "Siskin" at Brough, Flying-Officer John Clarke hit a shed and was killed. It appears that he got into a bump and one wing dropped on to the shed as he was passing over it; the machine burst into flames as it fell, and the pilot's body was badly burnt before it could be recovered.

Everyone will mourn him. He was one of those whom everyone instinctively liked and who seemed to do good to the world merely by being here. His record in the Service was brilliant and a remarkable career had been prophesied for him. He was 24 years of age and entered the Royal Air Force as an Aircraft Apprentice at Halton in 1923. His exceptional ability at once showed itself, as he gained a Cadetship and passed on to Cranwell.

Here he continued in the way he started, and after having been promoted to Flight-Cadet Under Officer he passed out with the Sword of Honour as the best all-round Flight Cadet, the R. M. Groves Memorial Prize for the best all-round pilot in the senior term, the Abdy Gerrard Memorial Prize for the highest total marks in Mathematics and Science, and the Air Ministry Prize for Aeronautical Engineering.

In December, 1926, he was posted to No. 29 (Fighter) Squadron, and in the spring of 1927 passed a course in Air Pilotage and Navigation at Calshot. In June, 1927, he received his promotion to Flying Officer.

In May this year he was chosen to represent his Squadron

in the race and competition for the Sassoon Trophy, and gained second place.

With Sergt. Morton he was runner-up in the Aerobatics Competition for Fighter Squadrons, and subsequently they gave a joint display of advanced aerobatics at the Hendon Pageant in July.

In September he was posted to Cranwell for Air Pilotage Duties, and it was his exceptional ability as a pilot which caused him to be attached to his old Squadron in order to take part in the Displays at Newcastle and Hull, in which he was chosen for individual events as well as formation flying with the Squadron.

He was just as brilliant at Rugger and played for Cranwell, and was a member of the Station Team at Duxford which won the R.A.F. Cup in 1928. Last season he played for the R.A.F. in nearly all matches, including those against the Navy and Army.

His talents also carried him to a unique position apart from the Service, in that he designed, built and flew his own light aeroplane.

The "Cheetah," as he called it, was a very fine little single-seater with a "Cherub III" engine, and was convertible from a biplane to a monoplane, and *vice versa*. His cheery presence with his machine was quite a feature at the Air Meetings during the past summer, and his loss will be keenly felt by all private owners and club members as well as by his brother officers.

Gipsy Reliability in Australia

MAJ. DE HAVILLAND having competed in the Sydney to Perth race and gained the fastest time and second place on handicap, recently returned to Melbourne, the total mileage being 5,000, during which time the Gipsy engine ran perfectly throughout. The engine he was using was a specially boosted one, and he ran it at 2,350 r.p.m. the whole

time, and the miles per gallon worked out at 17, which seems very low for such a gruelling trip. The oil consumption was of the same character, and on one stage of 770 miles he only used one quart of oil. Nothing was done to the engine except to adjust the tappets and clean the filters, and even the plugs were untouched. Vacuum oil was used for the trip.



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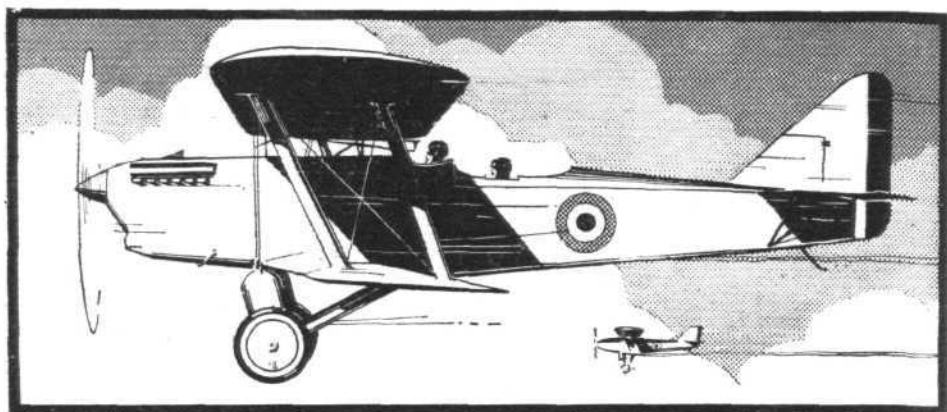
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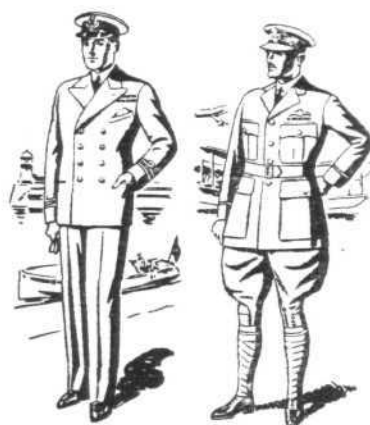
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MONTHLY summary, September.—The flying time for the month of September was made up as follows:—Dual instruction (144 flights), 67 hours. Advanced dual instruction (86 flights), 3 hrs. 30 mins. Solo training (50 flights), 22 hrs. 15 mins. "A" pilots (58 flights), 27 hrs. Tests and joyrides (51 flights), 7 hrs. 45 mins. Total for the month (311 flights), 127 hrs. 30 mins.

During the month the following ab initio pupils qualified for their "A" licences:—Mr. C. H. Hyde of Deal, Mr. Fotheringham Parker of Sydenham, Mr. L. Milton of Dover, Mr. E. S. Lambert of Folkestone, and Mr. Henry Calvert of Hildenborough. Both Messrs. Hyde and Parker were sent solo after under 8 hrs. dual, Mr. Parker needing only 5 hrs. 45 mins., and Mr. Hyde taking only 7 hrs. 15 mins.

Nine new flying members joined the club during the month, and four members holding "A" licences joined in addition.

Mr. Story and Mr. Twaites returned on Sunday, October 13, from their tour on the Continent. The flight was carried out without a hitch in spite of very unfavourable weather, and stops were made at Brussels, Cologne, Cassel, Berlin, Hanover, Amsterdam and Flushing. They stayed two nights at Berlin and the whole tour lasted eight days. The worst weather was encountered on the section from Hanover to Amsterdam, when a 40 m.p.h. head wind was met with, with the result that on landing at Amsterdam they had only about 15 mins. petrol left, in spite of using an auxiliary tank.

LEICESTERSHIRE AERO CLUB

ANALYSIS OF SEPTEMBER'S FLYING:—Flying was first commenced in the Leicestershire Aero Club when Flight-Lieut. Bateman, the Club's instructor, took the "Quorn" up on its initial test on Friday, September 13, in readiness for any call upon her at the Pageant next day. The description of our first Pageant, which has since proved a financial success, has already been described in an earlier issue of FLIGHT, so we need not repeat ourselves. Our figures for what remained of September show that we flew on 15 days and completed 20 hrs. 35 mins. dual; 14 hrs. solo, and 8 hrs. 25 mins. in other flying, totalling 43 hours altogether. Although nothing startling, it is enough to encourage our hopes for the future.

Solo Flying: Our first three pilot members to be released for solo after the traditional couple of landings dual, were Messrs. Hurst, Warren (our G.E.) and Winn (our Chairman), who went off in the order shown. All three are old R.F.C. pilots and were already known to our Pilot Instructor when at the Nottingham Aero Club. Mr. Cobb, of the Midland Aero Club, an "A" pilot, was the next pilot member released after a complete test. Mr. Medcraft, our fifth pilot member to go off solo, was actually the first member to do so, having been trained entirely in the Club's machine. His dual instruction consisted of a complete refresher, he having returned to flying after an absence of 11 years from the game.

Dual Instruction: The under-named members were given primary or secondary dual, and have yet to make their first solo flight in the "Quorn":—Messrs. P. Palmer (of the Lancashire Regt.), Baxter, Franklin, Wildbore, Colman, John Squirrel, Brown, How, Crowdy and Austin.

Taxi Hire: On September 25, the utility of the light aeroplane was illustrated to club members by Messrs. Winn and Hurst. The "Quorn" was flown up to Manchester, depositing Mr. Winn there for business, and then flown on to Hooton Park to collect Mr. Hurst, who had concluded his business in Liverpool and wished to return urgently to Leicester. Dual instruction was carried on in the afternoon after the flight.

Sir Sefton Brancker, piloted by Squadron-Leader Leslie, paid a lightning visit to the Club last Saturday, when he expressed astonishment at the zeal and zest shown by the Committee and members, the Club having now increased

its membership to close on 200 in number. A very successful lunch was held in the Grand Hotel to commemorate the visit. All members hoped to have him with them again. After lunch Sir Sefton Brancker was flown in the "Quorn" to Nottingham, Mr. Roy Winn accompanying Squadron-Leader Leslie on this flight.

THE NORTHAMPTONSHIRE AERO CLUB

REPORT for September. Total flying time for the month was 67 hrs. 5 mins. (dual 36 hrs. 35 mins.; solo 13 hrs. 5 mins.; passenger flying 7 hrs. 50 mins.; tests 9 hrs. 35 mins.).

During September, five flying members and 11 associate members joined the club. Mr. Skinner and Mr. Butcher commenced flying. In response to popular demand, the Committee have provisionally fixed their next flying meeting for Whit Monday, 1930. The Flying Committee intends to get going on novelty events for this meeting, and secretaries of clubs are asked to kindly make a note of the date.

The annual meeting of the Club was held at The Grand Hotel, Northampton, on Monday, October 7, 1929. About 60 members were present. Mr. K. Whitmore and Mr. G. W. Baldwin were elected new members of the Committee. The Club bar accounts and balance sheet were read showing a profit on the six months' working.

The Committee's report showing that the flying for the five months from April to September 1 realised a total of 300 hrs. was approved. Membership of the Club is now over 300.

YORKSHIRE AEROPLANE CLUB

REPORT for September.—Flying time for month: 127 hrs. 5 mins. Throughout the whole month of September we had only two machines in commission, G-EBSV and G-AABD, and therefore the above time compares very favourably with August when we had three machines in commission and flew 106 hrs.

Messrs. Lockey, Illingworth, Ellis, Garside, and Winandy succeeded in giving very creditable first solos, and Messrs. Lockey and Illingworth managed to get their "A" licence tests done before the end of the month.

Six new flying members joined during the month and two associates. All the new flying members have already commenced instruction.

FROM THE FLYING SCHOOLS

Brooklands School of Flying, Brooklands Aerodrome

(Oct. 7-13).—Flying time, 38 hrs. Cold weather, strong winds, rain and other inclemencies, coupled with Mr. Willett's Daylight Saving Bill always depreciates one's flying time, temper and one's financial gain; this happened, like everybody else, to us. We managed, however, to take a formation of our private owners around Great Britain; wherever they went they were greatly impressed by the welcome and hospitality they received. This made an excellent practical course in navigation which they greatly appreciated.

The Phillips and Powis School of Flying, Reading Aerodrome

(Oct. 4-10).—Flying time: 17 hrs. 20 mins. Instructor: Mr. W. Giddy. The school has received an order from Mr. F. Roy Tuckett for a Gipsy Moth for his flight from London to Cape Town and back, which he proposes to make next month. Mr. Tuckett will endeavour to do the trip in record time. We wish him every success.

The following new pupils have this week joined the school—Messrs. Fennall, Allen and Brown. Mr. Tuckett has joined as a soloist to keep his hand in while waiting for delivery of his new machine.

R.A.E.S. AND INST.A.E.E.

Official Notice

On Thursday, October 24, 1929, Capt. Norman MacMillan, M.C., A.F.C., will lecture before the Royal Aeronautical Society on "The Art of Flying Land and Sea Machines." The lecture will be illustrated, and will be delivered in the Lecture Hall of the Royal Society of Arts, 18, John Street, Adelphi, W.C.2.

Captain Norman MacMillan, who is the well-known test pilot of the Fairey Aviation Company, and the author of "The Art of Flying," has drawn from his wide experience to produce one of the most instructive lectures ever delivered before the Society. He attacks the problem from an unexpected and unique angle, showing the wide differences between the actual performance of an aeroplane and its calculated performance. The main body of the lecture is divided into three parts:—(1) The take-off; (2) Fully air-borne flight; (3) Alighting.

Captain MacMillan goes very thoroughly into the practical problems to be faced both for land and sea 'planes and the lecture is, indeed, an instruction book in miniature on the art of flying. He has succeeded, too, in avoiding going over any ground covered already by his well-known book.

J. LAURENCE PRILLHARD,
Secretary.

WESTLAND AIRCRAFT SOCIETY

On October 10, the Annual Meeting of the Westland Aircraft Society, branch of the Royal Aeronautical Society, was held in the canteen, with Mr. A. C. Keep in the chair, supported by Mr. P. W. Petter, Vice-President of the Society and Managing Director of Petters, Ltd.

In opening the meeting, Mr. Keep referred to the work of the Society in the past, and predicted that this, the fourth session, would be even more successful. He explained that the number of employees had grown since last year, and the membership of the Society would, no doubt, increase accordingly. One pleasing result of last year's operations was that following a series of lectures 66 per cent. of the entrants for Ground Engineer's examinations had passed. In a second examination, 75 per cent. passed.

On October 25, said Mr. Keep, Lady Bailey had kindly consented to come and lecture on the subject of her flying in Africa, and Col. the Master of Semphill, President of the Royal Aeronautical Society, had also consented to be present.

The Secretary, Mr. V. S. Gaunt, then presented his report for the past year. The membership of the Society had increased from 157 to 250 in the last session and it was hoped that this would be increased.

The Treasurer, Mr. Johnston, then presented the balance sheet, which showed a balance of £54 0s. 9d. As the balance carried forward from the previous session amounted to £28 15s. 5d., this figure indicated that there was a net increase of £25 5s. 4d. In moving the adoption of accounts, Capt.

Hill explained that the balance would not be hoarded, but was intended for the use of the members of the Society, and any suggestions as to the best methods of using the money would be welcomed by the Committee. A number of books were being purchased to augment the library, and the provision of a club room was suggested. Mr. R. A. Bruce, Managing Director of the Westland Aircraft Works, was unanimously re-elected President for the coming year. The following members were elected to the Committee:—Messrs. Pomeroy, Mathews, Hellier, Brigham, Hill Keep, Radcliffe and Withey. Mr. V. S. Gaunt was again unanimously re-elected, with Mr. H. Penrose as Asst. Secretary. Mr. Johnston also agreed to continue his work.

Mr. P. W. Petter expressed his satisfaction at the progress made by this live and useful organisation. He referred to the technical nature of the work of the Westland Aircraft and Petter Engine Works, and to the good work done by the Society in arranging lectures of a technical and instructive nature. He wished the Society success in the coming year.

Lectures for 1929-30 Session (First Half).—October 19, Conducted tour of Petter's Engine Works and Foundry; October 25, "My African Flight," Lady Bailey (in Assembly Rooms, Yeovil); November 1, "Cold Working of Metals," J. W. Berry, Esq. (Stourbridge Rolling Mills); November 8, "Aero Brakes," P. E. Hall, Esq., Chief Engineer of Bendix-Perrot Brakes, Ltd.; November 14, "Aircraft in Canada," Maj. D. C. M. Hume, R.C.A.F.; November 22, "Aero Wheels and Tyres," Dunlop Rubber Co., Ltd., Lecture and Film; November 25-27, Film, "1/30th Part of a Hair" (Grinding Operations, etc.), loaned by Alfred Herbert, Ltd.; December 5, "The Airship R.100," by Mr. Brigham (Chief Inspector, Westland Aircraft Works); December 14, Visit to Whitby Bros. Gloving Factory, Yeovil.

S.M.A.E. Competitions Results

The following are the results of two competitions held by the Society of Model Aeronautical Engineers on Wimbledon Common on September 28 last. The wind on this occasion was very gusty and unkind to the models.

	Freshmen's Competition			
	1st.	2nd.	3rd.	Best Position.
Englefield (M.A.C.) ..	12 4/5	—	—	12 4/5
* J. van Hattum (S.M.A.E.) ..	32 1/5	44 1/5	27 2/5	44 1/5 —1st.
— Ives (S.M.A.E.) ..	6 3/5	8 1/5	9 4/5	9 4/5
B. K. Johnson (S.M.A.E.) ..	11 2/5	14 1/5	4 3/5	14 1/5 —3rd.
A. G. Tucker (S.M.A.E.) ..	7 2/5	5	6 1/5	7 2/5
A. M. Tillis (M.A.C.) ..	5 2/5	3 4/5	28 1/5	28 1/5 —2nd
* J. E. Pelly Fry flew as proxy for van Hattum.				
	Novices' Competition (Non-members)			
	1st.	2nd.	3rd.	Best Position.
H. Braine ..	4	6 4/5	3 3/5	6 4/5
Miss Evans ..	6 2/5	—	4	6 2/5
R. Haines ..	2	4 2/5	12 1/5	12 1/5 —1st.
G. Ives ..	4 4/5	6	5 1/5	6

RANGE OF AIRCRAFT

THE first lecture before the present session of the Royal Aeronautical Society (with which is incorporated the Institution of Aeronautical Engineers) was given on October 10 by Mr. C. R. Fairey, and the subject was "Range of Aircraft." As was natural, much of the paper dealt with the Fairey monoplane which made a non-stop flight from England to Karachi in April of this year, but the general aspect of long-range flying was dealt with also, and the lecturer attempted to forecast what was likely to be the ultimate range attained by heavier-than-air craft without refuelling, arriving at the conclusion that with petrol engines it was likely to be somewhere in the neighbourhood of 10,000 miles, while the oil-burning compression-ignition engine, if the weight could be got down to some 3 lbs./h.p. and the consumption to 0.32 lbs./h.p., would increase the range far beyond anything which was now in sight.

Range, Mr. Fairey said, was the one quality in an aeroplane to which the designer could set a limit to his ambitions. When range had reached a distance of just over 12,000 miles, equivalent to the greatest distance between any two points on the earth, his task was presumably at an end, and in practice probably much earlier, as the distance between which aeroplanes would have to operate would certainly be less than this.

Tracing the growth of world's long-distance point-to-point non-stop records, Mr. Fairey pointed out that in the early stages of man's efforts to fly, the range was limited by the behaviour of the engine, the flight commencing when the engine could be induced to start, and terminating when the engine stopped. It was 1906 before the first official record was logged—one of 220 m. made by M. Santos Dumont. In a recent attempt in America (with refuelling during flight) a duration of 420 hours was attained, equalling approximately 35,000 air miles flown, proving that the actual life of the engine was the limit of attainment. A chart was shown illustrating the advance in range from the beginning of human flight and up to the present time. For purposes of comparison a corresponding graph was given for speed, and it was interesting to find how closely the two curves paralleled each other. During the first few years after the war isolated long-distance flights maintained the progress as engines became more reliable, and in the five years from 1923 to 1928 the range record was nearly doubled, reaching 4,450 miles in a straight line. The lecturer expressed the opinion that the possibility existed, in view of recent developments, of almost doubling this figure within the next few years.

The next section of Mr. Fairey's lecture dealt with the need for range. It varied considerably with the type of machine, and an examination of contemporary aircraft designs showed that the maximum range of a fighter did not exceed 400 miles; that of two-seater reconnaissance and light bomber machines was limited to 600 miles, and the longest range of any general service or troop-carrying type at present made did not exceed 1,200, so that a 600-miles band of ocean was all that was at present necessary to protect one country against another. This was only a temporary state of affairs, and a considerable extension of the range of military aircraft was to be expected. In commercial aviation an increase in range was an outstanding necessity, particularly to the British Empire, where the problem of inter-communication would appear to demand a machine (always assuming a reasonable paying load) of nearly 2,000 miles range. The nearest point to England that was British territory was Malta, at a distance of 1,300 miles. A further jump of 1,100 miles took the machine to the Canal zone, whence further distances of 1,000 and 1,350 miles took the machine to India. With a machine of 2,000 miles range the India air mail could be carried in three jumps—Malta, Baghdad and Karachi, in an overall time of about 60 hours. In short-range machines, such as on the London-Paris route, the fuel load was only 16 per cent. of the total weight lifted. On the New Brunswick-Cleveland stage of the New York-Chicago route, one of the longest non-stop ranges at present in operation, the fuel formed one-third of the total useful load.

Concerning the problems of attaining range, the lecturer showed a number of curves relating to most economical speed at various wing loadings, etc. As the general nature of curves of this sort should be familiar to those of FLIGHT's readers who understand graphs, we will skip this part of Mr. Fairey's paper and go on to the section which dealt with the Fairey monoplane which made the England-Karachi non-stop flight. The general purpose, Mr. Fairey said, of the design of long-range aeroplanes was to aim at the attainment of range only, the useful load being reduced to crew

and necessary supplies. The interchange of fuel for useful load reduced attainable range, but points gained in the design towards attainment of long range react equally for the attainment of economic carriage of useful load.

The Fairey monoplane was designed for a range of 5,500 miles, and exhaustive tests carried out had proved it capable of this. A crew of two had to be allowed for, and flying and navigation instruments, as well as equipment for emergency in case of forced landing. The useful load necessary would then be something like 800 lbs. In the choice of engine one was limited to the water-cooled type, as in a case like this weight was a lesser evil than resistance. Reliability was the all-important factor, as the engine must be able to run unattended for some 60 hours. The engine chosen was a standard Napier "Lion" of 7 to 1 compression ratio. It was fitted with special carburettors to improve the fuel consumption over the required throttle range. Take-off conditions imposed limits on the power loading and wing loading. In this country, to avoid ocean crossings, the climb required in the first few hours was likely to set a limit on maximum loading. In considering size of machine, one was restricted by the power of the engine available, but naturally it must be large enough to reduce the useful load to an insignificant proportion of the total. Until that stage was reached there were manifest advantages in increasing the size.

Arrangements of biplanes and high and low-wing monoplanes developed along parallel lines were thoroughly explored, and the monoplane was chosen largely on account of the scope for cleanness of profile which it appeared to offer. The wing position was finally decided after comparative wind-channel model tests. The choice made had, Mr. Fairey said, been fully justified by the high values of lift/drag ratio that had been realised (maximum about 15, according to a curve shown). The cantilever monoplane had an outstanding advantage in that its thick wing section provided ample accommodation for the fuel, oil and reserve water, and so avoided the necessity of using a large-section fuselage. The choice of wing position was influenced by the fact that the high wing position avoided the necessity for relying entirely on pumps. The single-engine type was chosen on account of its low drag. The undercarriage had to be of very substantial construction in view of the heavy load that had to be taken off the ground, and formed by far the largest item of parasite resistance. Mr. Fairey pointed out that if the undercarriage could be dispensed with, the range would have been increased by over 1,000 miles. The addition of such small parasite resistances as air-driven dynamos would reduce the range by over 300 miles.

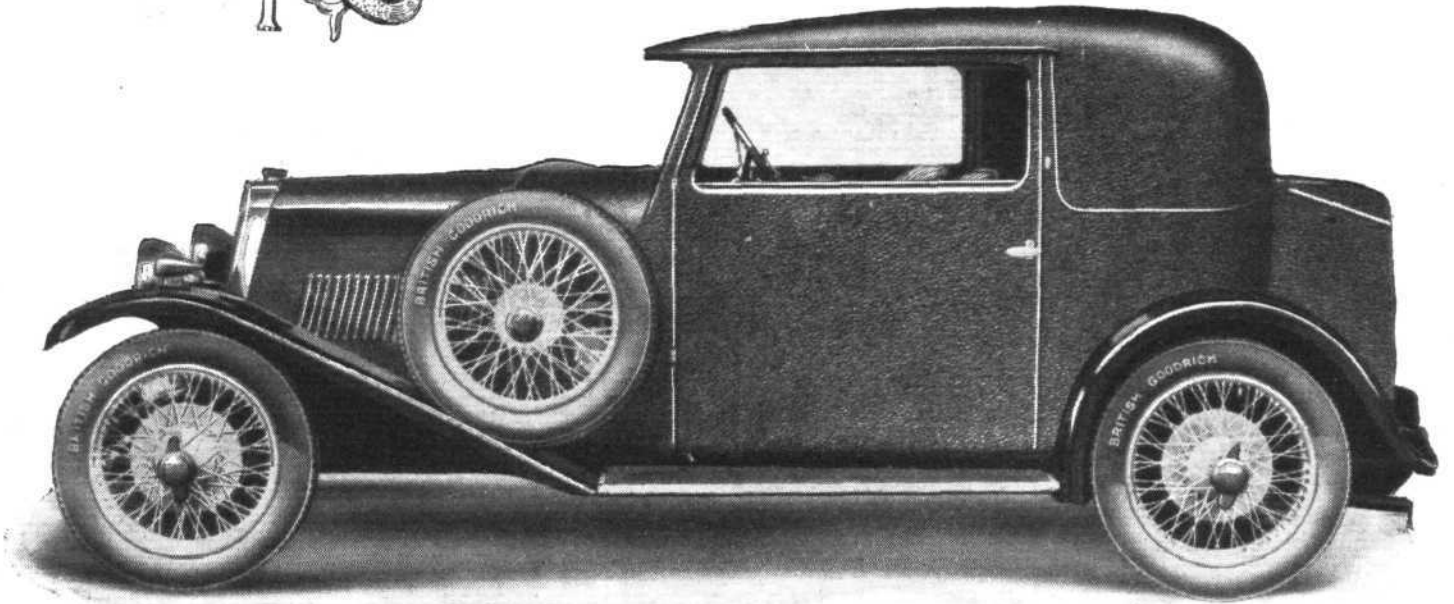
The wing, of tapered and twisted form, was of 82 ft. span, with an aspect ratio of 7.5. It was designed to be particularly favourable for the cruising conditions, and channel tests showed that the L/D curve had a smoothly-rounded peak for a maximum value exceeding 22 to 1. The fuel was carried in tanks in the wings, as was also the oil and reserve water. The fuel tanks had a total capacity of 1,157 gallons, the reserve oil tank 85 gallons, and the reserve water tank 35 gallons. The special instruments were confined to flow-meter, turn indicator and statoscope, with a special apparatus to give audible warning of any rapid change of height. The Farnborough flow-meter was an outstanding success, and proved of the utmost value. Exhaustive calibration tests were made to ascertain the fuel consumption at various loads, and Napier's succeeded in reducing the fuel consumption by an average of some 13 per cent. bridging, in fact, the gap between the standard service engine and the best theoretical results by about half, at between ranges of 60 and 70 per cent. of full power.

Take-off tests with increasing loads led to extremely high hopes, until it was discovered that they were greatly influenced by the frozen condition of the ground. Take-off with an all-up weight of 14,000 lbs. (3,000 lbs. short of full load) was made in a distance of no more than 403 yards. Cranwell aerodrome is sloping, and it was necessary to take off up the slope. The rise is 30 ft. in 1,600 yards. In the fully loaded condition the climb of the machine was 140 ft. per minute, and with the load carried on the India flight 260 ft. per minute, the corresponding angles of climb being 1° and 2° respectively. The failure of the machine to get off with full load was partly due to the unfrozen ground, and partly to the up-hill take-off.

In the actual flight, the machine carried 1,043 gallons of fuel, equivalent to a total weight of 7,620 lbs., and sufficient for a range of 4,800 miles, giving a margin of 340 miles over



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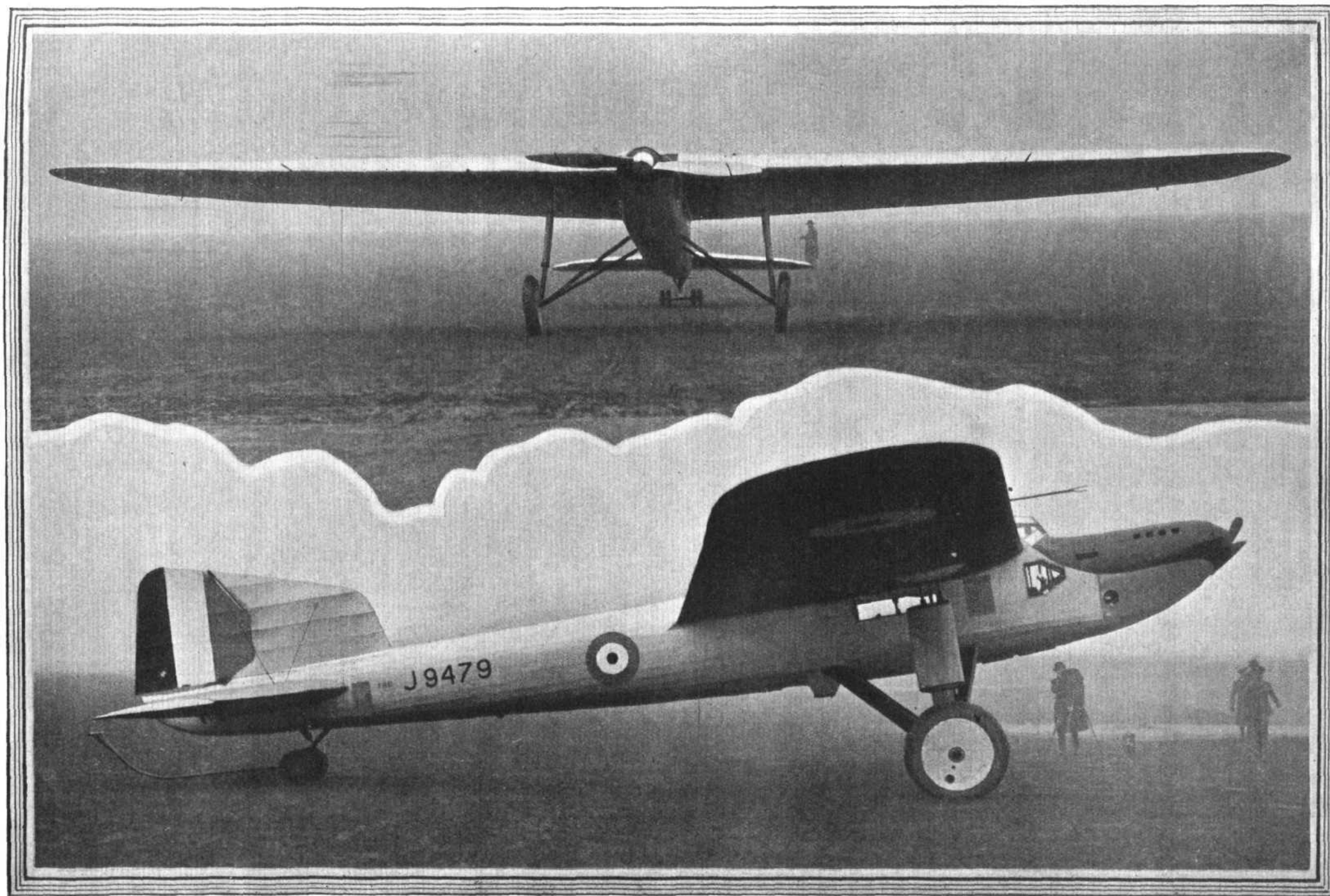
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the then existing record. The machine took off with a run of 1,235 yards against the wind, and within 5 mins. the machine had turned back and passed over the aerodrome at a height of 1,000 ft. It climbed to well over 2,000 ft. in the first quarter of an hour. The engine was throttled within a few minutes of taking off. The machine encountered head winds after passing Baghdad. After passing Karachi the crew calculated that the range still in hand was not enough to enable them to beat the record, and as to continue onwards would have meant landing in the dark in unknown country, they returned to Karachi where a landing was made, the time in the air being 50 hrs. 37 mins. The machine was credited with a great-circle distance of 3,950 miles. The actual track distance was approximately 4,290 miles. The fuel left at the conclusion of the flight was 82 gallons. The engine, a few minutes after the take-off, was throttled back to 420 b.h.p., and thence by stages to a minimum of 210 b.h.p. The "Lion" not only ran with perfect steadiness and without trouble of any kind (in fact the same engine carried the machine back to England by easy stages) but achieved an *average* fuel consumption of 0.46 lb./h.p./hr., equivalent to 4.4 miles per gallon on the distance flown.

Future Possibilities

Mr. Fairey then turned to a consideration of the possibilities of further extension of range. Referring to Prof. Melvill Jones's ideal streamline aeroplane, in which there was no turbulence, Mr. Fairey said that if it was assumed that the whole machine, of necessity equipped with undercarriage and tail skid, fulfilled the conditions for the "ideal" machine, the "Lion" still being used, the range would be 8,500 miles. The difference between the "ideal" and the results actually achieved was attributable to the turbulence caused by the undercarriage and the radiator, which accounted for roughly one-half and one-quarter respectively of the total parasitic drag on the present machine. If the radiator resistance were eliminated the range would be increased to over 6,000 miles, and if the undercarriage could be discarded in flight or retracted into the fuselage and wing, a further increase to 7,200 miles would be attained. Without those appendages the machine had a value of 87 per cent. of the "ideal" streamline machine.

If an engine were available of 1,800 h.p. of the same power/weight ratio and of equal efficiency, it would appear to be possible, without asking any higher aerodynamic efficiency, to launch a machine capable of a flight of 8,700 miles. This was still 3,500 miles short of the arc of the hemisphere, but sufficient to girdle the earth along latitude 70°. The use of twin engines did not assist, owing to the increased drag of the extra power plant. In the case of the Fairey monoplane, if its power plant was split up into three engines, the maximum range would be reduced from 5,500 to 4,400 miles with air-cooled engines, or to just over 5,000 miles with water-cooled engines.

The most promising line of improvement for the future would appear to be along improved fuel consumption. The Napier Company had succeeded, by means of special tuning of a 7 to 1 compression ratio engine, to lower the consumption to a minimum of 0.43 lb./h.p./hr., this minimum in addition being lowered to a point at about two-thirds full power. If this figure could be extended down to one-quarter full throttle, it would have a marked effect on range. If a carburettor could be produced having the same efficiency from 22 per cent. of the power range upwards as it now had at 70 per cent., the range of the Fairey monoplane would be increased to 6,000 miles by this factor alone. If this improved carburettor could be applied to the engine of 1,800 h.p. installed in the ideal aeroplane they had imagined, a range of 10,000 miles would be attained, or alternatively a useful load of nearly 20,000 lbs. could be carried for a range of 2,000 miles.

Another hope was approaching feasibility in the oil-burning compression-ignition engine. Such an engine, incorporating a consumption of 0.32 lb./h.p./hr., of not more than 3 lbs./h.p. in weight, and developing not less than 1,800 h.p., would give a machine the range of which would exceed the range of any machine, real or hypothetical, which they had considered.

"In conclusion," Mr. Fairey said, "I would like to emphasise the point that the endeavour to attain maximum range in a machine lifting its fuel for the entire journey will lead along very similar lines to the same development and improvement in aircraft that has resulted in the design for pure speed, and in addition will make far greater demands on the durability of the power plant. Since practical ranges of the future for commercial aircraft are not likely to exceed 2,000 miles, except possibly for some of the longest

trans-ocean routes, we may visualise already the possibility of carrying a very large load in a single machine for these ranges with a fuel load of only one-third of the total useful weight lifted."

The Discussion

THE CHAIRMAN (Col. the Master of Sempill) said that in view of the recent paper ("Monoplane or Biplane?") read by him before the Society, he would call upon Mr. W. S. Farren to open the discussion.

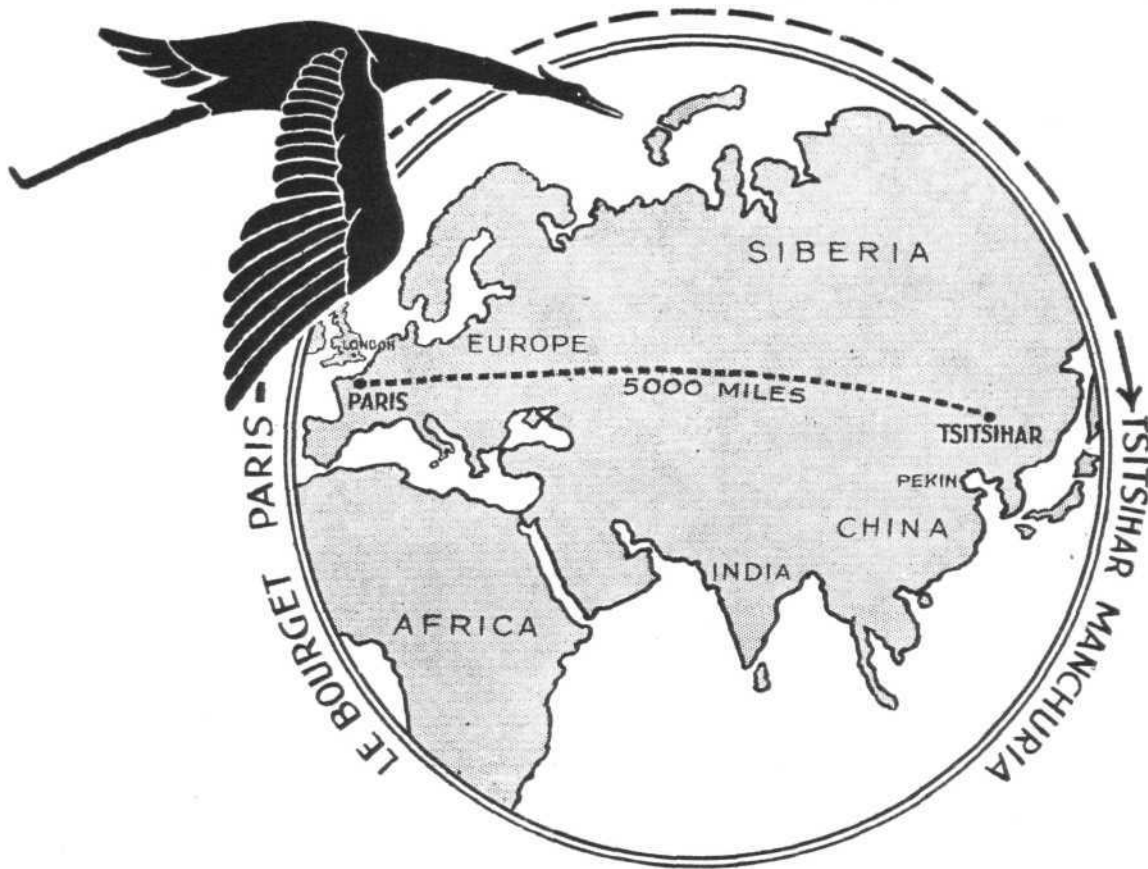
MR. FARREN thought they should congratulate the lecturer on a very interesting paper, and the Air Ministry, in other words, themselves, for having had the courage to finance such a very interesting and instructive experiment. The chairman had referred to the recent paper by him (Mr. Farren) on monoplane or biplane? He (Mr. Farren) did not, however, wish to go into that subject on the present occasion, and it would appear that there was not a great deal to choose between them, as Mr. Fairey had got much the same results with the monoplane as M. Breguet had obtained with the biplane. He would like to ask the question "Are we justified in asking people to run the risks involved in what is, after all, merely beating a record?" He did not think there was any need to answer the question, but it should be kept in mind. The question would inevitably be asked "What had been learnt from this long-distance flight?" He personally was quite content to accept Mr. Fairey's statement that the machine was capable of doing 5,500 miles, and from his point of view, the actual flight was not necessary to give the proof. He was, however, convinced of the great value of the advertisement resulting from the flight. His friends often exclaimed, when he talked of advertisement, "you surely do not mean advertisement in a vulgar sense?" To that he replied "In as vulgar a sense as you like." There could, in his opinion, be no question of the value of the advertisement which such a flight gave.

On one or two technical points he did not quite agree with the lecturer. For instance, he did not agree that the petrol load and useful load could be regarded as interchangeable. On the question of range, he did not agree with Mr. Fairey that for Empire purposes ranges of 2,000 miles would be demanded. He thought something of the order of one-quarter of that range more probable. The extra speed resulting from non-stop flying did not seem to be great, as the Fairey long-distance machine took 50 hours to do 4,000 miles, or an average speed of 80 m.p.h. This might appear quite a good average between England and Karachi, but he did not really think it was. Moreover, on Empire air routes passengers would probably not be able to stand such long stages. They would require a rest occasionally. He thought the lecturer had taken a very "parochial" view of the future of aviation. When they were using these long non-stop ranges, it was equivalent to carrying the fuel for the next stage from home to, say, the middle of France. Surely it would be much cheaper to pick up the petrol in France.

MR. F. HANDLEY-PAGE agreed with Mr. Farren concerning "advertisement." He would include not only the general public, but also the institution which had become known as the Air Ministry, and which needed to be convinced. (Laughter.) Machines like the Fairey monoplane gave them an opportunity to say to the Air Ministry that if they might be permitted to throw overboard all the various excrescences with which the service machine was encumbered, they could produce a real aeroplane. When they had convinced the Air Ministry, they could follow two lines. They could get real speed, as in the Schneider machines, or they could get range and load-carrying, as in the Fairey monoplane.

On the subject of fuel consumption, he had found that the figures given by the engine people, obtained on bench tests, were very difficult to duplicate in the air, possibly because the engine was contaminated by its surroundings. (Laughter.) The paper brought out very forcibly the improvements that could be attained merely by a better fuel consumption, and without improvement in the aeroplane. He agreed with Mr. Farren, and doubted whether passengers could stand the strain of the long non-stop distances. He rather looked to mails for the long non-stop routes. Mr. Fairey had shown some curves, but he would like further data of weights, areas, etc. Finally, he thought Mr. Fairey had produced a very fine machine, and the only improvements which he could suggest were certain appendages near the wing tips! (Laughter.)

MR. CHORLTON thought that the figures quoted by the lecturer for fuel consumption would be attainable. With the experience now available, he did not see why, in a couple of years time or so, they should not produce a compression-ignition engine with a consumption of 0.35 lbs./h.p./hour at a weight of 3 lbs./h.p. The present difficulty was mainly



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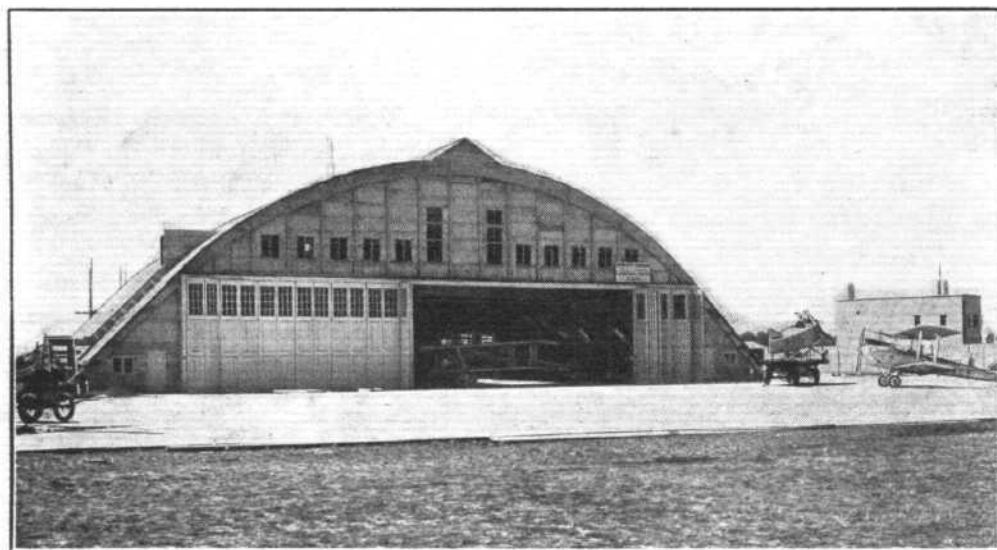
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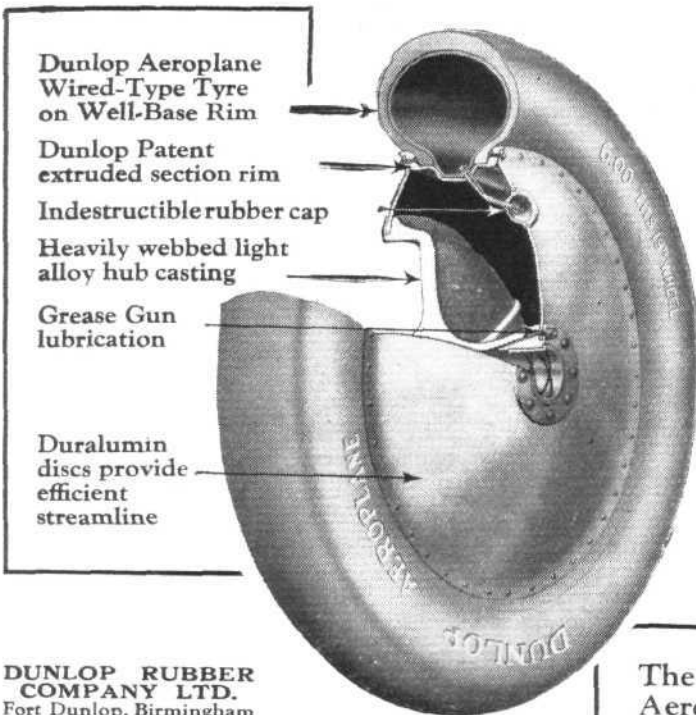
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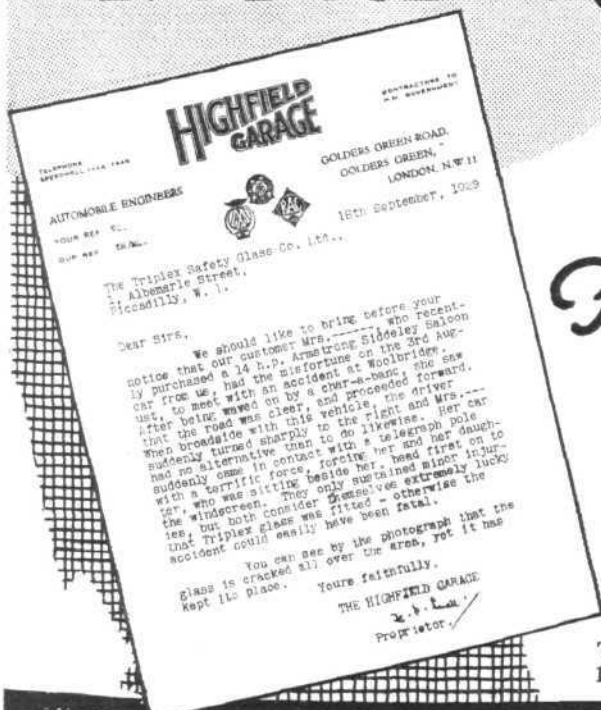
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in connection with the injection, which needed improving. They had to get a sort of carburettor action inside the cylinder itself.

CAPTAIN BARNWELL regarded Mr. Fairey's paper not only as an interesting one, but as an inspiring one, because it made them think. On the question of whether the air-cooled or the water-cooled engine was the better for long-range aircraft, he did not feel competent to speak, but he would point out that the water-cooled engine had had a lot of development and had been brought to a high state of perfection as regards its cooling system. The air-cooled on the other hand, could still be improved a lot in this respect and was, he thought, capable of a greater proportional improvement than the water-cooled. Turning to the question of monoplane or biplane, he could have wished that the lecturer had given more information on the assumptions made before deciding on the cantilever monoplane. He thought there probably was not a great deal of difference between the two types, but his own personal preference was still slightly in favour of the biplane. The lecturer had given the figure 800-lb. for two pilots, instruments and, presumably, consumable stores. This seemed high, and he would like to know of what it was made up. He would also like to know whether wind tunnel tests showed an appreciably lower drag for the monoplane. Finally, he would very much like the lecturer to give figures for structure weight.

COL. FELL was interested in the improvements due to the engine builder. The drag of the radiator appeared high, and he would have thought that wing surface radiators and evaporative cooling would have given an appreciable improvement. As regards low consumption at small throttle openings, recent experiments indicated that much could be done by using a supercharger which could be cut out. The naturally-aspirated engine would still have a high compression ratio. The lecturer had asked for an engine of 1,800 h.p. as the most suitable for long-range aircraft. Such an engine, in view of recent developments, should be quite possible, but was the lecturer certain that a propeller could be produced for such an engine to give good efficiency?

MR. McKINNON WOOD also wanted to know why wing radiators were not used, as they would appear to give a great reduction in drag. In view of the fact that for the same span the biplane had a lower induced drag, he would have thought that the biplane type would have been better for a long-range machine. Some work had recently been done by Boulton & Paul and by Mr. Jennings on the most economical span to get low induced drag, taking into account the increase in wing weight with span. He suggested the chairman should ask Mr. Jennings to say something about that subject.

MR. JENNINGS said the lecturer had stressed the importance of reducing profile drag. At long-range speeds, the induced drag was quite a large proportion. He had been doing some work on the subject of the best span, for a biplane of some 9,000 lbs. weight, and had found that the maximum range would be increased if the aspect ratio was raised from 7.5 to 12.5. The lecturer had made no reference to the advantages of flying high. It would appear that there was a definite gain.

MAJOR F. M. GREEN had something to say on the vexed question of water-cooled or air-cooled engine. On the score of consumption, he thought that if the two types were placed on a comparable basis there was little difference. If the two engines had the same compression ratio they would show exactly the same consumption. The lecturer had referred to the higher drag of the air-cooled ruling it out for long-distance aircraft. That might have been true once, but he did not think it was true any more. The Townend ring had made a great difference. He had made a rough estimate, which indicated that the radial engine fitted with Townend ring would have required less than one gallon per hour more fuel to overcome the extra drag, and against that they could off-set the water carried on the flight for the water-cooled engine.

THE CHAIRMAN (Col. the Master of Sempill) said that Squadron-Leader Jones-Williams was present, and had said that although he refused to take part in the discussion, he was willing to answer questions. As none of the speakers had asked any question he (Col. Sempill) would ask some in order to get Jones-Williams on his feet. (Laughter.) He would like to know something about the comfort in the cabin during the flight, and whether any improvements were required or contemplated. He would also like to hear something about the navigation problems during such a flight.

SQUADRON-LEADER JONES-WILLIAMS said that they found their arms got tired. Otherwise the comfort in the cabin was satisfactory. The placing of the seat was also a little difficult, as it was found that in its most forward

position the seat was still too far away to enable Flight-Lieutenant Jenkins to reach the foot bar, while in its farthest rearward position it was still too close to the bar for himself! (Laughter.) He refused to be drawn out on the subject of navigation, as Flight-Lieutenant Jenkins was present.

FLIGHT-LIEUTENANT JENKINS retaliated by saying that he would not accept that excuse, as Squadron Leader Jones-Williams had been under going a course in navigation, and was quite capable of answering questions. As a matter of fact, they had had no great difficulties and on the whole the instruments were satisfactory. The only exception was, perhaps, the drift indicator, which was just a little too crude, mainly due to the desire not to have any projections from the fuselage. A new drift sight was to be used on the next attempt.

MR. FAIREY said he would try to reply to some of the questions at once, while in the case of others he promised to reply, or to give the added information asked for, in the written reply of the discussion. He considered it very sporting of Mr. Farren to refrain from raising the question of monoplane or biplane, especially as he would have been quite entitled to point out that the world's distance record had undoubtedly been beaten recently by a biplane, the Breguet. On the question of long ranges for Empire aviation, the long stages would be forced upon them, and were not a result of choice. The "parochial" view was not his but that of the Persian Government, which refused permission for machines to land in their territory. The long stage covered by the Breguet in the recent Costes-Bellonte flight was, he thought, in part due to them having had a following wind over a considerable proportion of the flight, while the Fairey monoplane had encountered strong head winds on a large proportion. He thought there might be reason to believe that the fuel consumption of the Hispano engine had been got down to a very low figure by special means. At his works they had recently had occasion to bench-test a 600-h.p. Hispano engine for Vickers, and that engine gave some astounding consumption figures. It had no less than six carburettors, each feeding but two cylinders. If the Hispano firm had got a fuel reduction on the record-breaking engine proportional to that achieved by the Napier firm on the engine in the Fairey monoplane, a very large increase in range would result.

Replying to Mr. Handley Page on the question of wing tip appendages, he had made a rapid calculation and found that if they had fitted slots, which he quite believed would improve any machine, they would have infringed some 148 patent rights in 50 hours! (Laughter.) On the question monoplane or biplane, he was prepared to believe that the biplane might give a slightly lower induced drag, but the overwhelming advantage of the cantilever monoplane chosen was that it enabled them to get the tanks inside the wing. With a biplane they would have needed a very large fuselage to accommodate the tanks. No wind tunnel tests had been made on a biplane model. The monoplane had been chosen before these tests were made, and the tests were confined to the best wing position of a monoplane. It had been found that the low-wing position was slightly better, but that would have necessitated the use of petrol pumps, and a good deal of piping, and the high-wing position was chosen, which all but gave them gravity feed.

Turning to the question of air-cooled or water-cooled engines, Mr. Fairey said the subject of relative consumption had not been taken into account in making the selection. That was a problem he would leave to the engine people to thrash out. The Townend ring was not available when the machine was designed, and so they naturally had to judge the air-cooled engine on its drag without the ring. He agreed that evaporative cooling would be an advantage, and his firm had been experimenting, but did not at the time the machine was produced feel justified in using any but well-tried systems for such an important flight. He quite realised the importance of wing surface radiators, but they had to cool, at the beginning of the flight, some 500 h.p., while towards the end of the flight the engine had been throttled to a little over 200 h.p. That meant the necessity for varying the cooling within wide limits, and the retractable radiator was therefore selected.

The choice of a cantilever wing, apart from the advantage of housing the tanks in it, was also dictated largely by his dislike of very long streamline bracing wires, such as would have been required in a braced structure. The cantilever arrangement fairly quickly put a limit on the increase in span which would pay. He thought his firm could not be accused of not realising the importance of high aspect ratio, as their machines had higher aspect ratios than those of any other firm.

THE ROYAL AIR FORCE

London Gazette, October 11, 1929.

General Duties Branch

The follg. are granted permanent comms. as Pilot Officers, with effect from September 28, 1929, and with seniority of September 28, 1928:—H. B. Collins, G. C. Holland. The follg. are granted short service comms. as Pilot Officers on probation with effect from and with seniority of September 23: J. A. Nicholson, G. W. Stranraer-Mull, J. S. Tanner. The follg. Pilot Officers on probation are confirmed in rank (September 17):—G. D. Hoyland, S. S. Mackay. The follg. Pilot Officers are promoted to rank of Flying Officer:—L. E. A. Wright (June 30); J. Beaumont, V. H. Nicolay, R. Chadwick, F. P. Donovan, R. S. Darbyshire (Act. Sub-Lieut., R.N.R.). N. X. Sheldrick, R. F. A. W. Williams, F. B. Taylor, M. I. Barnett (September 16).

Air Vice-Marshal Hugh C. T. Dowding, C.B., C.B.G., relinquishes his appointment as Director of Training, Air Ministry (September 7). Flying Officer F. M. Denny is seconded for service as Aide-de-Camp to the Governor of Victoria (September 26).

The follg. are placed on retired list at their own request.—Flight-Lieut. H. A. Anson (October 1); Flying Officer J. F. Mehigan (October 7). The follg. Flying Officers are transferred to Reserve, Class A:—M. G. Bircham (October 3); M. Fountain-Barber (October 8). Lieut.-Commander E. J. S. Knockner, R.N., Flight-Lieut., R.A.F., relinquishes his temp. commn. on

return to Naval duty (August 9). The short service commn. of Pilot Officer on probation D. A. Gowing is terminated on cessation of duty (October 8). The follg. Lieut.-Commanders, R.N., Flight Lieuts., R.A.F., cease to be attached to R.A.F. on return to Naval duty (October 3):—E. W. Anstice, S. Richardson.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Pilot-Officer J. M. Longley is promoted to rank of Flying Officer (October 2); Pilot Officer G. C. Holland relinquishes his commn. on appt. to a perm. commn. in the R.A.F. (September 28).

Medical Branch

Flight-Lieut. W. Parsons resigns his commn. on appt. to a commn. in the Royal Army Medical Corps (September 11).

AUXILIARY AIR FORCE

General Duties Branch

No. 603 CITY OF EDINBURGH (BOMBER) SQUADRON.—The follg. to be Pilot Officer:—T. M. McNeil (July 30).

LEEDS AND BRADFORD MUNICIPAL AERODROME

(Concluded from page 1116.)

way of diverting footpaths. The City Corporation had vision, he said, and he hoped that before very long they would be able to travel to London and back every day instead of once a week, as they now did. He would like to mention that they had already had very great assistance from Sir Sefton Brancker, and indeed from everyone they had approached.

Sir Benjamin Dawson proposed the toast of "Our Host, Lord Brotherton," and enumerated the very long list of things that he, Lord Brotherton, had done for aviation and for the country in general. He had, he said, learnt to take off and land himself, but then the insurance companies had made it impossible for him to continue flying. Now that they had at last got something definitely under way toward getting a municipal aerodrome he felt that they could congratulate themselves, and especially on having such a man at the head of their aviation interests as they had in Lord Brotherton. The time was coming, he felt, when aviation would be so remunerative that municipalities would be clamouring for the monopoly of providing facilities for it.

Lord Brotherton then replied in a well-chosen speech, in which he said that his chief regret was that he did not know more about it but he would now endeavour to make up lost time. Time, he said, we all knew was money, and before long we should be old-fashioned if we did not travel by air.

Lady Bailey, on being called upon, hoped that the outcome of this gathering would be a really fine aerodrome and an air-port of which they could be proud. N.F.S. will undoubtedly accelerate the time when aviation will be a very important matter to them, she said, and with reference to the mention which had been made of the aliveness of the lady members of the clubs, she would also like to add her testimony to this, as she had had the pleasure of seeing how hard they worked in the cause of the club.

Fire-Fighters on New British Airships

R.100 and R.101 are both equipped throughout with Essex Fire Extinguishers. These appliances have given very good accounts of themselves in other spheres of work, and Mr. Mossley informs us that considerable business is being done with the aircraft industry. Their works at Mortlake are fully occupied.

Air Navigation Licences

THE first of the classes in connection with the examinations for first and second-class Air Navigation licences, which, as announced in last week's issue, are being organised by Capt. A. G. Lamplugh, of the British Aviation Insurance Group, on behalf of the Guild of Air Pilots and Air Navigators, will be held on Monday, October 21, at 6 p.m., in the Library of the Royal Aeronautical Society, 7, Albemarle Street, W.1. We understand that there are vacancies for a few more students should they desire to attend.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910.)

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1927 being given in FLIGHT, January 19, 1928.

	Imports.		Exports.		Re-exports.	
	1928.	1929.	1928.	1929.	1928.	1929.
Jan.	1,220	2,852	157,598	74,307	330	100
Feb.	1,772	6,532	118,622	195,369	345	2
March	4,805	1,210	125,901	204,664	1,307	902
April	2,904	5,816	134,126	186,477	3	115
May	2,513	4,706	118,804	243,549	640	1,243
June	5,916	9,304	86,245	144,817	1,317	750
July	2,025	6,961	108,746	139,695	521	—
August	2,566	16,706	97,303	160,625	100	4
Sept.	4,240	510	72,475	237,303	3,183	9,686
	27,961	54,597	1,019,820	1,586,806	7,746	12,802

AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

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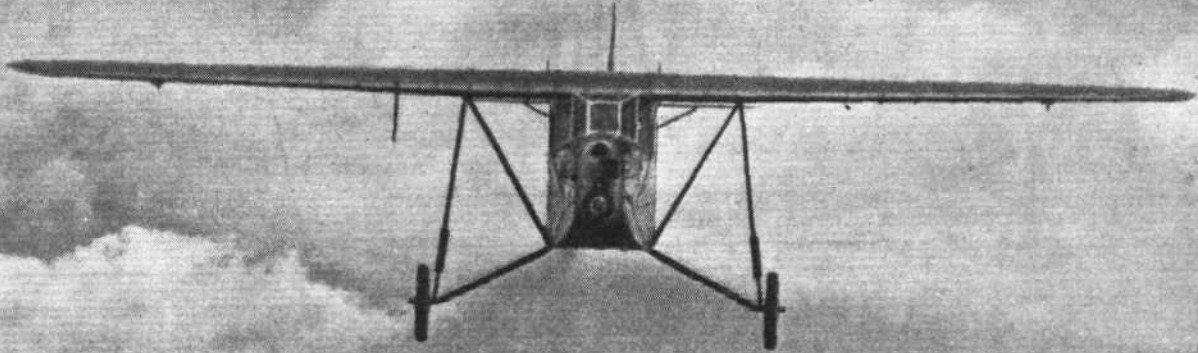
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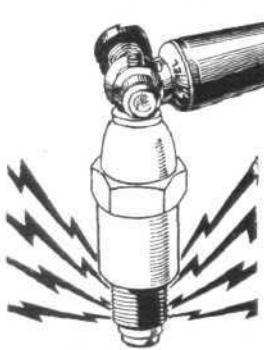
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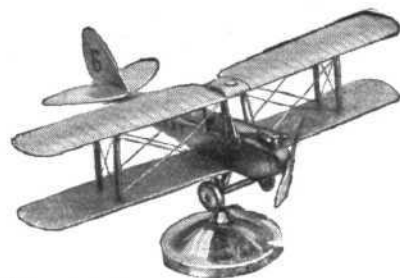
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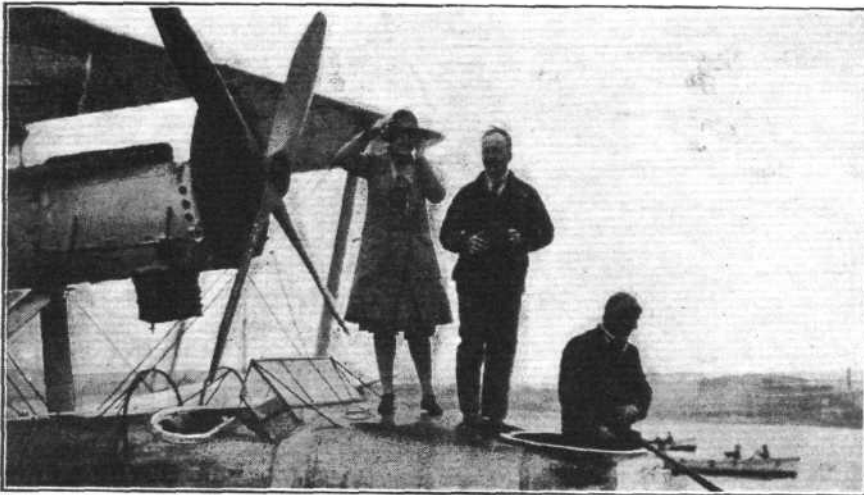
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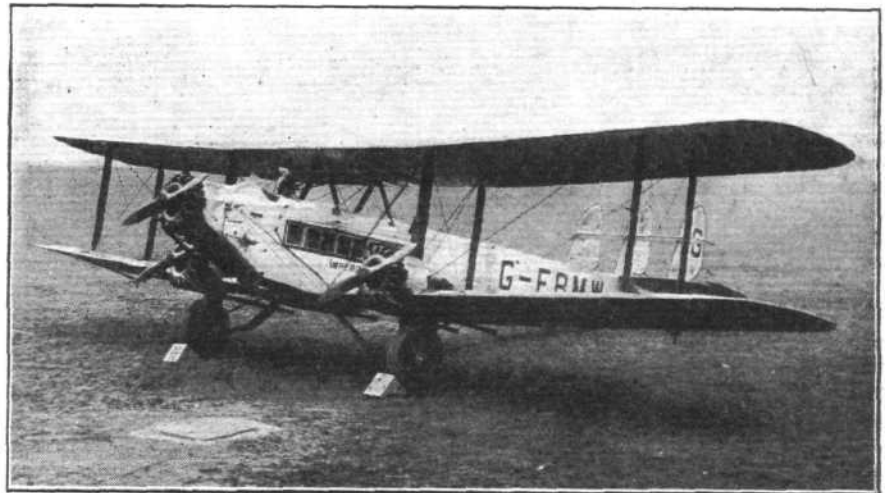


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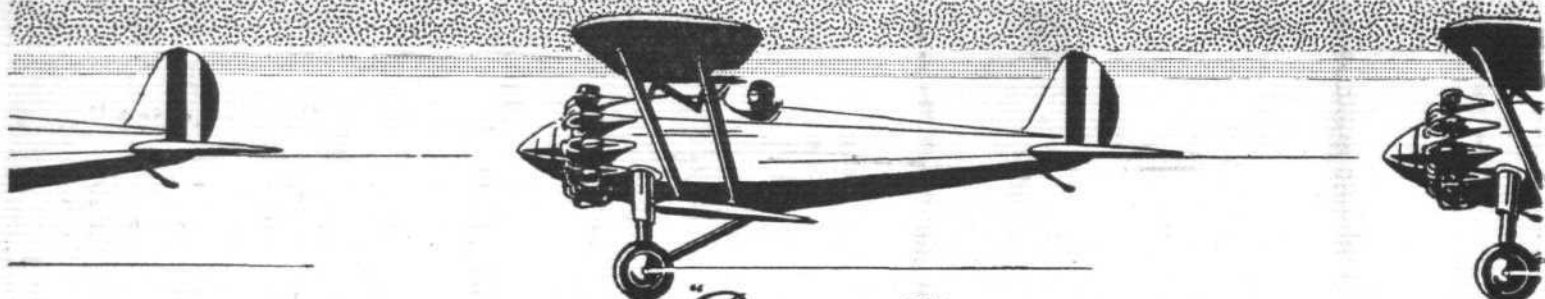


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